



FRIDAY, MARCH 26.

Train Accidents in February.

The following accidents are included in our record for the month of February:

COLLISIONS.

REAR.
1st, night, passenger train on Concord Railroad ran over a misplaced switch and into some freight cars on a siding at Hooksett, N. H., damaging locomotive and 2 cars.
2d, very early, passenger train on Chesapeake & Ohio ran over a misplaced switch and into freight standing on the siding in Staunton, Va. Both engines were badly wrecked, fireman killed, both engineers badly, and 2 passengers slightly hurt.
2d, night, freight on Baltimore & Ohio ran into preceding freight near Dillon's Falls, O., wrecking several cars.
3d, very early, coal train on New York, Lake Erie & Western broke in two near Guymard, N. Y., and rear section ran into forward one, wrecking several cars.
5th, p. m., passenger train on Delaware, Lackawanna & Western ran over a misplaced switch and into freight on siding in Newark, N. J., damaging several cars.
8th, early, freight on Missouri Pacific broke in two in St. Louis and the rear section ran into forward one, wrecking several cars and knocking down two buildings adjoining the track.
9th, night, passenger train on Atchison, Topeka & Santa Fe ran into rear of a freight stuck in a snow drift near Mitchell, Kan., wrecking 2 engines, a caboose and 4 freight cars. The freight cars caught fire and were destroyed. A fireman was hurt. The freight had sent back a signal, but the engineer failed to see it, owing to a driving snow at the time.
10th, a. m., freight on New York, Lake Erie & Western ran into cars broken loose from preceding freight near Mahwah, N. J., wrecking several cars. A car loaded with oil in barrels caught fire and six cars were destroyed.
11th, night, passenger train on Mobile & Ohio ran over a misplaced switch and into freight standing on a siding at Oklahoma, Miss., damaging several cars.
11th, night, freight on Georgia Railroad ran into preceding freight near Covington, Ga., damaging several cars.
11th, early, freight on New York Central & Hudson River ran into preceding freight at Lockport Junction, N. Y., damaging the caboose.
12th, a. m., freight on Columbus & Western broke in two near Columbus, Ga., and rear section ran into forward one, wrecking several cars and injuring the conductor.
12th, a. m., as freight on Chicago & Northwestern was making a flying switch at North Aurora, Ill., the brakes were not put on the detached cars soon enough, and they ran into freight standing on a siding, wrecking several cars and throwing 2 of them over on the station, wrecking the building completely.
13th, p. m., yard engine on West Jersey road ran into passenger train in Camden, N. J., damaging a car.
16th, a. m., freight on New York Central & Hudson River ran into preceding freight which had stopped in Rochester, N. Y., damaging 6 cars.
16th, p. m., freight on New York Central & Hudson River ran into preceding freight which was going on a siding at Clyde, N. Y., damaging several cars.
23d, very early, freight on Western & Atlantic ran into some cars which had broken loose from a preceding freight near Chickamauga, Ga., and had been partly wrecked, damaging the caboose and several cars.
23d, night, freight on Grand Trunk ran into preceding freight near Merrittton, Ont., wrecking several cars.
25th, night, passenger train on Lake Shore & Michigan Southern ran into freight which had stopped for water at New Carlisle, Ind., wrecking several cars.
26th, night, freight on Pittsburgh, Fort Wayne & Chicago ran into preceding freight near Hiland, O., wrecking several cars.
27th, very early, freight on Northern Central ran into preceding freight near Watkins, N. Y., and engine and several cars were wrecked.
BUTTING.
2d, p. m., butting collision between passenger and freight train on Grand Trunk near La Prairie Junction, Que., damaged both engines badly.
5th, very early, butting collision between two passenger trains on St. Louis, Iron Mountain & Southern near Williamsville, Mo., wrecked both engines and several cars, killed 2 trainmen and injured another.
8th, a. m., butting collision between passenger and freight train on Chicago, Milwaukee & St. Paul at North La Crosse, Wis., damaged both engines and several cars and injured a trainman.
9th, night, butting collision between two freights on Louisville & Nashville, near Pensacola, Fla., wrecked both engines and several cars.
13th, midnight, some person unknown jumped on an engine which was standing on the Baltimore & Ohio tracks at Parkersburg, W. Va., waiting for a train, and opened the throttle and jumped off. The engine ran some 12 miles, when it met a freight train bound in. Both engines and a number of freight cars were piled up in a very bad wreck, killing the fireman, injuring engineer and 3 other trainmen.
24th, a. m., butting collision between passenger train and wild engine on Elmira, Cortland & Northern, near Erin, N. Y., damaged both engines considerably.
24th, p. m., butting collision between freight and work trains on Wabash, St. Louis & Pacific, near Bonfils, Mo., wrecked both engines and 20 cars. The freight was running against orders.
CROSSING.
2d, p. m., passenger train on Burlington, Cedar Rapids & Northern ran into Central Iowa freight at the crossing at Manly Junction, Ia., wrecking the engine, killing an engineer and injuring 2 other trainmen.
11th, a. m., passenger train on Atlanta & West Point ran into passenger train on Savannah, Griffin & North Alabama at the crossing in Newnan, Ga., wrecking the engine and damaging several cars and injuring 2 trainmen.
19th, a. m., freight on Pittsburgh, Cincinnati & St. Louis ran into a passenger train on the Mt. Lookout dummy road at the crossing at Cincinnati, O., wrecking dummy car and injuring its engineer and conductor and 3 passengers.
19th, a. m., local passenger train on Woburn Branch of Boston & Lowell ran into passenger train on the main line at the crossing in Wilmington Junction, Mass., wrecking a passenger car completely and damaging a baggage car. One passenger was fatally hurt, and 4 trainmen and 6 passengers less severely injured.

DERAILMENTS.

BROKEN RAIL.

1st, a. m., freight on Louisville, New Albany & Chicago was derailed near Corum, Ind., by broken rail.

1st, p. m., freight on Texas & St. Louis was derailed near Lockheart, Tex., by broken rail and 2 trainmen hurt.
2d, a. m., freight on Wisconsin Central was derailed near Marshfield, Wis., by broken rail.
4th, night, passenger train on Wabash, St. Louis & Pacific was derailed near Rochester, Ind., by a broken rail.
8th, night, passenger train on Wabash, St. Louis & Pacific was derailed near Ivesdale, Ill., by broken rail.
9th, very early, freight on Wabash, St. Louis & Pacific was derailed in Moberly, Mo., by a broken rail, and 3 cars were wrecked, injuring 6 drivers who were in the caboose.
6th, a. m., passenger train on Missouri Pacific was derailed near Kansas City, Mo., by broken rail, injuring 7 passengers.
10th, a. m., freight on Marietta Mineral was derailed near Marietta, O., by a broken rail, wrecking several cars and killing 2 trainmen.
11th, a. m., passenger train on Central Iowa was derailed near Marshalltown, Ia., by a broken rail. The rear car was thrown down the bank, injuring 7 passengers.
12th, midnight, passenger train on Alabama Great Southern was derailed near Coaling, Ala., by broken rail, and the whole train went down the bank, injuring 13 passengers.
18th, noon, freight on Lehigh & Hudson River was derailed near Vernon, N. J., by a broken rail, killing a brakeman.

BROKEN FROG.

11th, early, mail car of passenger train on Vandalla Line was derailed in East St. Louis, Ill., by a broken frog.

BROKEN SWITCH-ROD.

7th, night, freight on New York Central & Hudson River was derailed at Medina, N. Y., by a broken switch-rod.

SPREADING OF RAILS.

1st, a. m., passenger train on Dayton & Ironton was derailed near Ironton, O., by spreading of the rails.
2d, p. m., freight on Florida Southern was derailed at Rochelle, Fla., by spreading of the rails, injuring engineer and two other trainmen.
16th, p. m., passenger train on Ohio Central was derailed at Ten-mile Trestle, W. Va., by spreading of the rails, and the rear car went off the trestle and was wrecked. A passenger was killed and 6 hurt.
19th, a. m., freight on Chester & Lenoir was derailed near Gastonia, N. C., by the spreading of the rails. Engine went down the bank, injuring 2 trainmen.

BROKEN WHEEL.

6th, very early, 5 cars of freight on New York, Lake Erie & Western were derailed near Lackawaxen, Pa., by a broken wheel.
12th, early, 2 cars of passenger train on New York Central & Hudson River were derailed near Iion, N. Y., by a broken wheel.
18th, night, freight on Cairo, Vincennes & Chicago was derailed near Marshall, Ill., by a broken truck wheel on the locomotive. The engine upset, killing 2 trainmen and injuring another.
25th, night, freight on Grand Trunk was derailed near Fergus, Ont., by broken wheel, injuring 3 trainmen.

BROKEN AXLE.

13th, very early, coal train on New York, Lake Erie & Western was derailed near Hornellsville, N. Y., by broken axle and 20 cars were piled up in a bad wreck.
14th, midnight, freight on Buffalo, New York & Philadelphia was derailed near Mt. Morris, N. Y., by a broken axle, and 7 cars ran down the bank and into a swamp.
18th, early, freight on New York, Lake Erie & Western was derailed near Otisville, N. Y., by the breaking of an axle under the tender.
19th, a. m., freight on Lehigh Valley was derailed near Pittston, Pa., by a broken axle.

BROKEN COUPLING OR DRAW-HEAD.

10th, very early, as freight on Texas & St. Louis was going up the incline at Bird's Point, Mo., the train broke in two and 6 cars ran back down the incline and plunged into the Mississippi River.
23d, very early, freight on Western & Atlantic broke in two near Chickamauga, Ga., and the rear section was derailed by a draw-head which fell on the track, killing a trainman and injuring 2 others.

ACCIDENTAL OBSTRUCTION.

17th, night, freight on Northern Pacific ran into a tree blown across the track near Tacoma, Wash. Ter., and the engine was derailed.

CATTLE.

26th, night, passenger train on Northern & Northwestern ran over a runaway team of horses near Thorn Hill, Ont., and 4 cars were thrown down a steep bank, injuring 2 trainmen fatally and 3 trainmen and 18 passengers very severely.

LAND-SLIDES AND WASH-OUTS.

11th, a. m., passenger train on Long Island road ran into a wash-out near Great Neck, N. Y., and the engine and 2 cars were wrecked.
12th, p. m., freight on Old Colony ran into a wash-out near Myrick, Mass., and the engine and 10 cars went down. The fireman was carried down with the wreck and killed.
12th, night, passenger train on Boston & Maine was derailed at Bradford, Mass., by land-slide.
13th, a. m., passenger train on Massachusetts Central ran into a wash-out at Clematis Brook, Mass., and the engine went down into the water. The engineer and fireman were hurt.
13th, a. m., passenger train on New York, Ontario & Western ran into wash-out near Liberty, N. Y., the engine and 3 cars going off. The engineer and fireman were killed, 3 trainmen and 3 passengers hurt.
17th, night, freight on Pittsburgh, Cincinnati & St. Louis was derailed in Pittsburgh, Pa., by a land-slide. A brakeman was hurt.

SNOW OR ICE.

4th, very early, passenger train on Norfolk & Western was derailed in Lynchburg, Va., by ice packed down in the frog.
4th, p. m., freight on New York, Lake Erie & Western was derailed at Cameron, N. Y., by ice in a frog.
11th, a. m., engine of freight on Buffalo, New York & Philadelphia was derailed near Tuscarora, N. Y., by ice in a guard rail.
26th, a. m., freight on Grand Trunk was derailed near Fergus, Ont., by ice on the track, and locomotive and 13 cars went down a high bank, injuring a brakeman.
28th, p. m., 2 engines and snow-plow on Maine Central were derailed near Bangor, Me., in a snow-drift.
28th, p. m., 2 engines and snow-plow on Maine Central were derailed at Cumberland Junction, Me., in a snow-drift.
28th, p. m., 3 engines with snow-plow on Maine Central were derailed in a heavy snow-drift near Westbrook, Me., and 13 trainmen were hurt.
29th, a. m., freight on Maine Central was derailed near Bath, Me., in a snow-drift.

MISPLACED SWITCH.

2d, a. m., passenger train on Oxford & Henderson was derailed in Oxford, N. C., by a misplaced switch, and the engine upset, injuring engineer and fireman.

2d, a. m., freight on New York, Lake Erie & Western was derailed near Rutherford, N. J., by a misplaced switch.
2d, night, passenger train on Manhattan Elevated was derailed at 145th street in New York by a misplaced switch.
23d, a. m., passenger train on Philadelphia & Reading was derailed near Tamaqua, Pa., by a misplaced switch. Two passenger cars were upset and badly damaged, injuring 10 passengers.
23d, night, passenger train on New York, Lake Erie & Western was derailed at Sparrowbush, N. Y., by misplaced switch.
27th, night, milk train on Housatonic was derailed near Hawleyville, Conn., by misplaced switch.

RUNAWAY ENGINE.

10th, p. m., locomotive on Buffalo, Rochester & Pittsburgh standing near the round-house in Rochester, N. Y., suddenly started out alone and ran across the yard and into the turn-table pit and was badly damaged. No one was on or near the engine, and it is supposed that a leaky throttle-valve started it.

UNEXPLAINED.

1st, p. m., freight on Pennsylvania Railroad was derailed near Snow Shoe Intersection, Pa., and locomotive and 11 cars were wrecked, killing 2 trainmen and injuring another.
3d, night, freight on Delaware, Lackawanna & Western was derailed near Nichols, N. Y., and several cars were wrecked.
4th, a. m., freight on Richmond & Petersburg was derailed at Pocahontas, Va., and the engine slightly damaged.
9th, a. m., freight on New York Central & Hudson River was derailed near Rochester, N. Y., and several cars were damaged.
17th, a. m., freight on Louisville & Nashville was derailed near Franklin, Tenn., injuring a brakeman.
17th, night, coal train on New York, Lake Erie & Western was derailed near Bradford, Pa., and 18 cars were wrecked.
18th, p. m., car of freight on New York, Lake Erie & Western was derailed in West Paterson, N. J., and thrown across both tracks.
18th, p. m., freight on Chicago & Evanston was derailed at Rose Hill, Ill., blocking the road several hours.
19th, p. m., as freight on Wilmington, Columbia & Augusta was approaching the bridge over the North East Cape Fear River at Hilton, N. C., a box-car jumped the track and struck the end of the bridge truss, knocking down one span. The derailed car and 6 others went down into the river. The bridge was of iron and the span 150 ft. in length.
22d, a. m., passenger train on Buffalo, New York & Philadelphia was derailed at Canewaukus, N. Y., and rear car upset, injuring 18 passengers slightly.
24th, night, engine of freight on Lackawanna & Pittsburgh was derailed near Angelica, N. Y., and upset down a high bank, killing engineer.

OTHER ACCIDENTS.

BOILER EXPLOSION.

23d, night, engine of freight on Chicago, St. Louis & Western exploded its boiler while standing at Kernan, Ill. The engine was completely wrecked. The engineer was thrown 75 yards and killed and the fireman badly hurt.

BROKEN PARALLEL RODS.

11th, p. m., locomotive of passenger train on New York Central & Hudson River broke a parallel rod when near Poughkeepsie, N. Y., and was considerably damaged.
21st, a. m., locomotive of freight on North Pacific Coast broke a parallel-rod near Saucelito, Cal., and the loose end struck the engineer and injured him fatally.
22d, a. m., locomotive of passenger train on New York & Greenwood Lake broke a parallel-rod when near Cooper, N. J., doing some damage.
26th, a. m., locomotive of passenger train on Delaware, Lackawanna & Western broke a parallel-rod when near Gouldsboro, Pa., and was considerably damaged.

SUMMARY.

This is a total of 98 accidents, in which 21 persons were killed and 157 hurt. As compared with February of last year, there is a decrease of 118 accidents, of 23 killed and of 102 injured.

The two months of the current year to the end of February show a total of 192 accidents, 62 killed and 247 hurt; an average per month of 96 accidents, 31 killed and 124 injured.

A fuller statement of the totals and averages, with a summary of the causes of accident, will be found on another page.

A Triumph of Engineering.

The owners of a narrow gauge road in Colorado point with pride to the fact that a mile of that thoroughfare cost \$150,000. The section of the road in question is cut out of the side of a mountain.

For a pioneer road this is perhaps an expensive construction, but the difficulties of railroad engineering presented in the most settled parts of the East are quite as great as those of roads among the Rocky Mountains, and are overcome by even more costly methods. The great Broadway Railroad is a case in point. This road, from its southern terminus at Bowling Green to its junction with the Seventh Avenue northern at Union Square, is less than three miles in length, and yet it has cost not less than \$5,000,000, or at least ten times per mile as much as the most expensive part of the road through the Rocky Mountains.

No doubt a part of this expense is to be accounted for by the more substantial construction of the Eastern road, which is double-tracked throughout and meted in the best manner, without regard to cost. The distinguished head of the company, Mr. Jacob Sharp, who supervised its construction throughout, has lately explained to a commission the extraordinary expense to which the company was put in order to get the very best steel for its rails, and the great costliness, also, of the excavations for the road-bed and the ballast.

Making all proper allowance, however, for these details of construction, it is evident that the great difference in cost between the New York and the Colorado road must be sought in the greater engineering difficulties presented to and surmounted by the former. A profile of the road shows an almost continuous ascent from Bowling Green, which is nearly at sea level, to the Union Square terminus, where the giddy altitude of nearly 60 ft. is attained, as determined by the surveying party through barometrical observations. The only break in the steady climb of nearly 20 ft. to the mile is furnished at the Canal street plateau. This section of the road, after a gradual descent from Leonard street, traverses the long level of the Collect Pond Cañon, and then begins the precipitous ascent toward Houston street at a grade of not less than 1 in 300. When the trains are behind time, and are making their utmost speed, the passengers who join the conductor on the rear platform can form some idea of the nature of the acclivity they are ascending by watching the frantic efforts of a fat man with a grip-sack to overtake the train. If he appears to be in danger of doing this, the conductor signals the engineer to go ahead at full speed, and then, if the track is clear, calls the attention of the



FIG. 1.—PARLOR SMOKING CAR, PENNSYLVANIA RAILROAD—LIGHTED WITH FROST LIGHT.

passengers to the rapidity with which the fat man seems to recede till he becomes a mere speck in the distance. On either hand rise sheer cliffs of marble, brownstone, and brick to the height of 70 or 80 feet, beetling above the tracks as if to overwhelm the train making its way underneath. This narrow gorge, which must have been blasted out at enormous labor and expense, continues, its bounding walls unchanged in height, until the summit is reached at Union Square, where a wide prospect suddenly opens to the traveler's vision. There still remains to be overcome the obstacle presented by the Lincoln Statue. This is skilfully avoided by a detour, the Great Horseshoe Curve, which is so sharp that by standing on the rear platform at the inner side of the curve the ears of the horses may be seen. This great bend brings us to the junction.

It must be evident to the Colorado people that their mountain railroad as a triumph of engineering skill is not to be compared with the Broadway line. European engineers are prone to imagine that their railroads are more solidly built than ours, but they may be challenged to produce the equal of these three miles of road at \$1,500,000 a mile. When the proposed extension of the Broadway line to Sing Sing is completed it will be a source of unalloyed pride and satisfaction to the citizens of New York.—*New York Times*.

The Master Car-Builders' Club.

The usual monthly meeting was held on the 18th inst. at the club rooms, 113 Liberty street, New York. In the absence of the President, Mr. C. A. Smith, the Secretary, occupied the chair.

A discussion took place on the best means of strengthening the ends of cars against the resistance of shifting bulk, such as grain, lumber, etc., in sudden stops.

MR. FORNEY suggested that the cross pieces at the ends should be trussed.

MR. E. F. BOSDEVEX (Pennsylvania): Car frames are generally too light, and are weakened by notching and cutting. A good pillar, a good side sill, and a good top rail are essential. Cars generally break out at the ends owing to the way the timbers are cut away. It is difficult to strengthen neatly, unless the cross pieces are made much heavier. The nailing piece should not be cut over, and the cross pieces ought to be heavier than the corner posts. The two intermediate end sticks usually split out at the bottom, tearing out the mortise. They might be tied by a diagonal rod under the floor, but the tenon does not go in far enough to do any good.

Some cars have the end sill and the side so constructed that the water will run down between the siding and the piece put over the end sill and eventually rots it out.

MR. SMITH (Union Tank Line): About 1 in. space should be left between the sill and the sheathing.

Some discussion then took place on the subject of 60,000-lb. three-truck cars, which are being used experimentally on the Little Rock & Fort Smith; the Pittsburgh, Fort Wayne & Chicago; the Vandalia Line, and the St. Louis, Iron Mountain & Southern.*

MR. FORNEY: The centre truck supports the weight of the centre of the car, and therefore the framing of the car need not be so strong. It seems to me, however, there would be great difficulty in equalizing the weight.

MR. SMITH considered three trucks unnecessary when two

*Finlay's patent centre truck for three-truck cars was illustrated in the *Railroad Gazette* July 11, 1884, page 514.

trucks with M. C. B. standard axles were sufficient for the 25-ton tank cars now used. The old tank cars held only 10 to 12 tons.

The amount of slack necessary in couplers was then discussed.

MR. BOSDEVEX considered 3½ in. sufficient.

MR. SMITH then asked: "What should be the leverage of freight car brake levers with brakes on only one truck, with a 14-in. brake wheel and shaft 1½ in. in diameter?" Many wheels are slid and spilt because the leverage on freight cars is altogether too great. It is estimated that a man on a 14-in. brake wheel with a 1½-in. shaft will pull 2,000 lbs. on the chain brake connecting rod. A great many will put on 3,000 lbs. I tried a contrivance at the Brooks Locomotive Works in Dunkirk for testing the strength of a man in putting on brakes. I pulled 1,200 lbs., but Mr. Brooks was able to pull 3,000 lbs.

The E. J. Frost Light for Cars.

The system of lighting illustrated herewith is one of the newer devices for obtaining a better and more convenient form of light for cars than lamps, and has been undergoing an extensive test since April, 1885, it is reported with very successful results. The light is certainly very brilliant, and it will be seen that by the ingenious device of utilizing the air supply of the brake reservoir so as to dispense with all need of compressing apparatus, the whole device is anything but complicated. It is claimed to be the cheapest style of lighting by gas in use, to give the most brilliant light of any, and to cost less for maintenance than oil lamps.

Fig. 1 represents the device as applied to a car which has been in constant active service since April, 1885. Figs. 2, 3 and 4 show the lamp and burner, and figs. 5 and 6 the gas "manufacturing" apparatus, which consists simply in passing compressed air obtained from the brake pipes into (1) a storage reservoir, (2) a reducing valve to 1 lb. pressure, (3) a carburetter charged with a porous mass saturated with oil and heated in winter by a pipe connected with the heating apparatus of the car, (4) a second reducing valve, and (5) to the gas burner. From this brief summary it is at once clear that the only work to be done in maintenance is to charge the carburetter with oil at proper intervals, and no plant is necessary. The apparatus on the car is complete in itself.

Fig. 1 gives a side view of the dry-carburetter, which is constructed of stout sheet copper, having heads of the same material brazed in. The interior of this carburetter is divided into a number of compartments by a series of parallel partitions, which extend entirely across it vertically, but not longitudinally, the partitions terminating at a short distance from either head alternately. This arrangement obviously makes a continuous but zigzag passage

way from the space on one side of the cylinder to the space on the other side. These passages are filled with strands of a capillary material drawn in very tightly, and with such large aggregate bulk that a large amount of oil can be held in suspension. Only three to five minutes is required for the purpose of charging. The absorbing capacity of the carburetter is great enough to leave no free liquid within it, when charged for a 40 or 50-hour run, a matter of great importance, as otherwise the motion of the car might occasion an irregularity in the light by the splashing about of the liquid; besides which, the use of free liquid would have in it an element of danger.

The air supply for the carburetter is taken from the main air brake-pipe and stored in a separate cylinder (at the right of fig. 5) of a capacity large enough to supply a standard passenger coach for some eight hours when detached from the locomotive. It is necessary to lock the air in the cylinder when the car is detached from the locomotive, and for this purpose a check valve is placed in the air pipe leading to the air cylinder, so that air may enter freely but cannot escape from it. This is also necessary to avoid interfering with the normal working of the brakes.

As the pressure in the air cylinder will be from 1 to 80 lbs. according to the situation of the car on or off the train, and as it is desirable to have a uniform pressure on the carburetter at all times, a pressure regulator is placed between the air cylinder and the carburetter, as shown in fig. 5, which is set at any pressure desired, usually 1 lb. per square inch.

The air passing through the carburetter becomes charged with the vapor of the oil, and passes thence into the pipes supplying the gas fixture through another pressure regulator shown above the gauges in fig. 5, which is set to reduce the pressure to one ounce, or about 1½ in. of water, this being the burning pressure. This second reducing valve also acts as a check on any possible accumulation of pressure on the carburetter which might cause the light to fluctuate. The two pressure gauges shown are connected (1) with the air cylinder, thus indicating how long the lights will burn without further supply of air, and (2) to the carburetter, revealing at once any defect which might arise in either of the reducing valves.

The capacity of the carburetter now in use is from 40 to 50 hours service for five burners, giving each 50 candle-power, which it is needless to say is a very high power for a car light. The cars now in service are very conspicuous for the brilliancy of their illumination, so much so that it instantly attracts attention on entering them. Three burners will light a car quite as brilliantly as is usual, but the cost of running the additional burners is small.

Figs. 2, 3 and 4 clearly show the construction of the

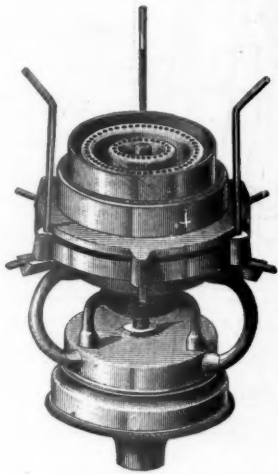


Fig. 4.—Frost Gas Burner.

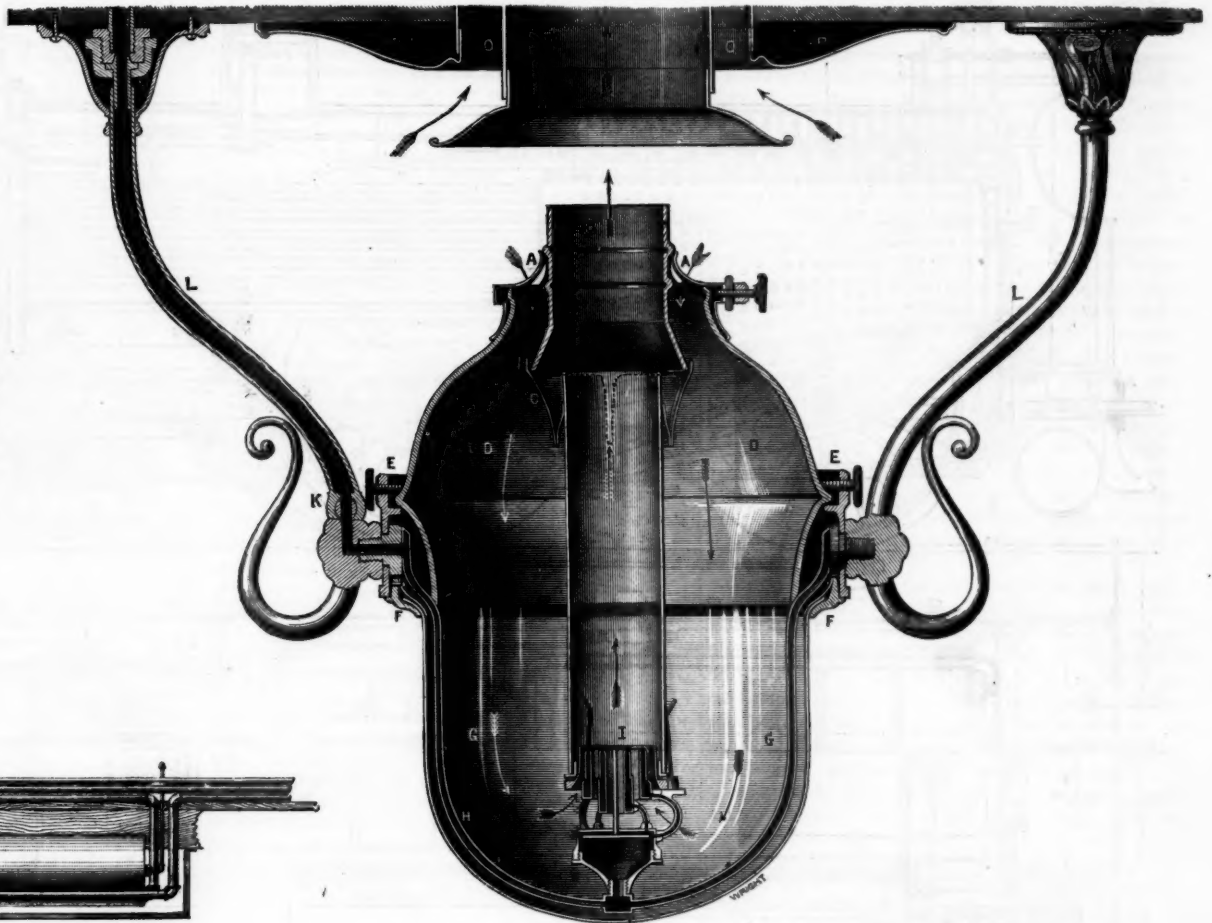


Fig. 2.—Section of Lamp.

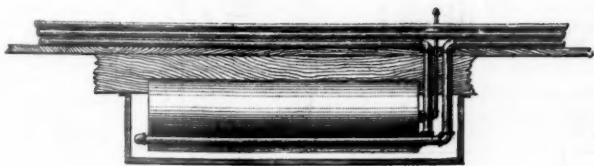


Fig. 6.—Side View of Carburetter

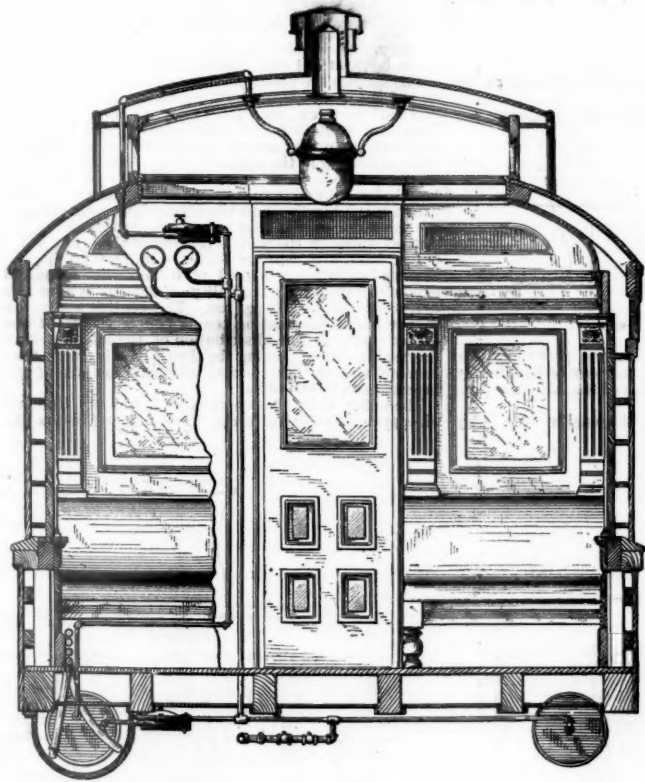


Fig. 5.—Arrangement of Carburetter and Connected Parts. Scale, $\frac{3}{4}$ in. = 1 ft.

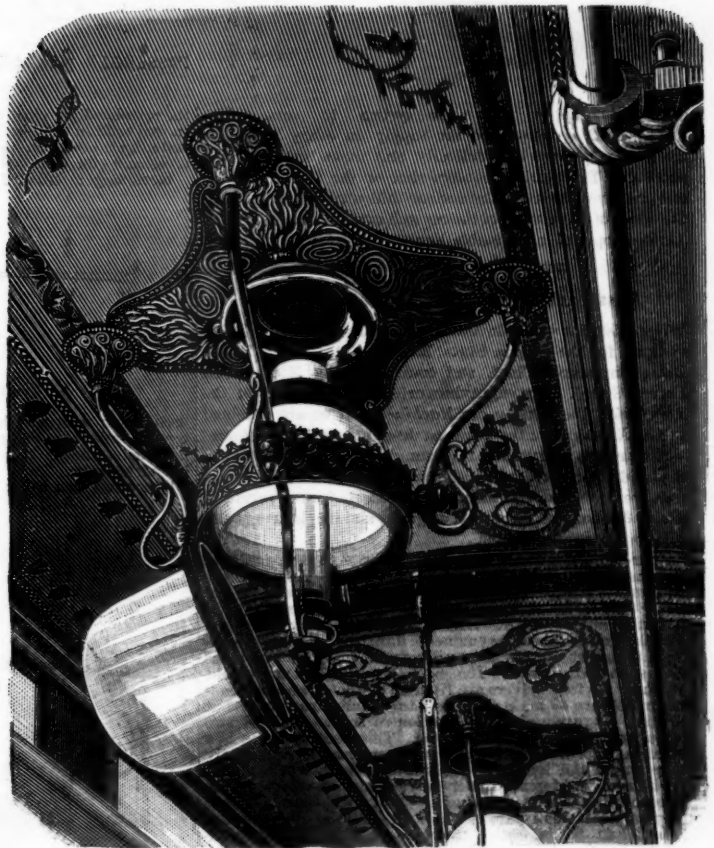


Fig. 3.—Lamp with Lower Globe Open.

THE FROST LIGHT FOR CARS.

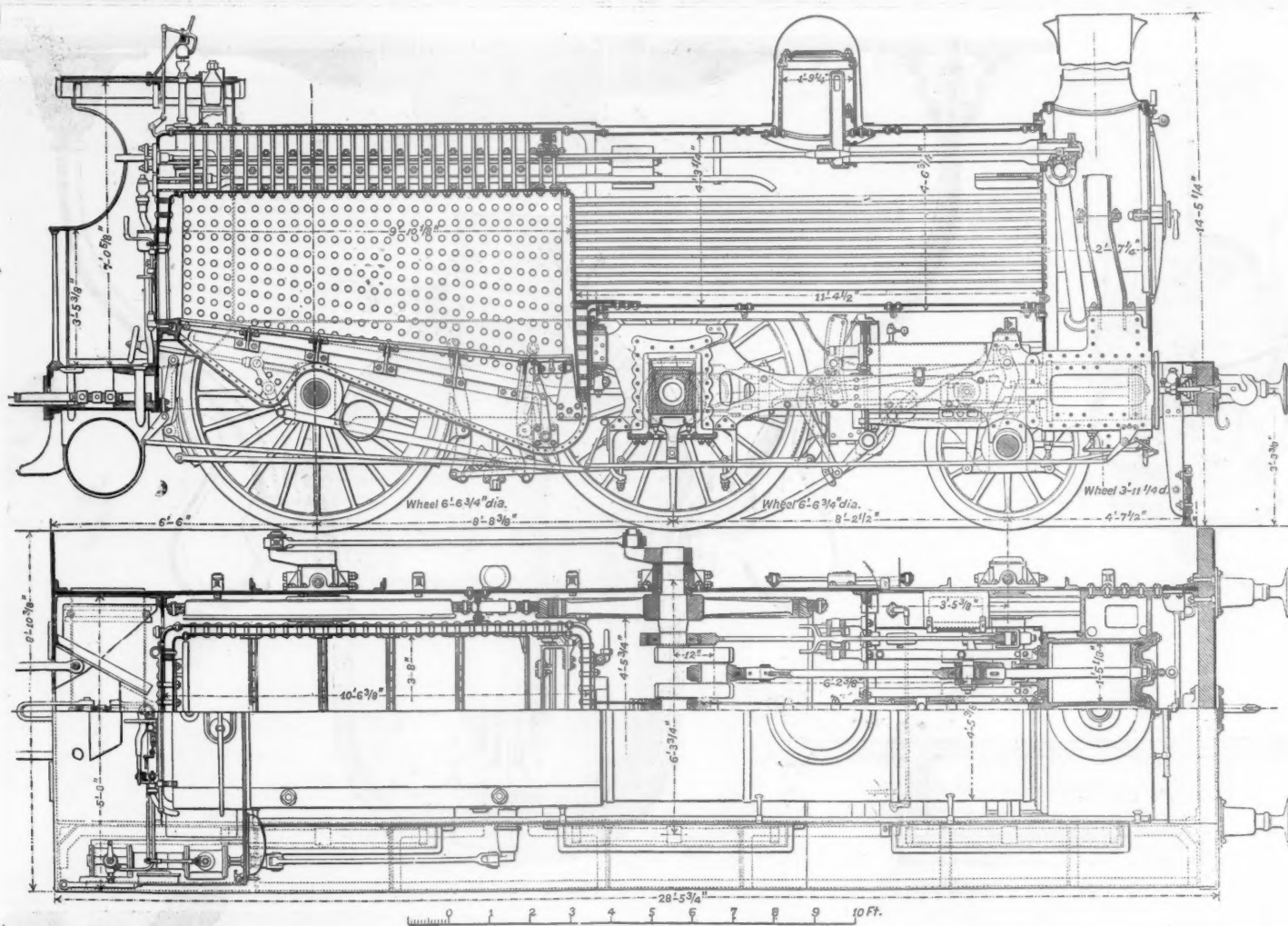
lamps, the cost of which is about the same as for oil lamps. They are manufactured by Mr. John Williams, of New York, in any desired style. The burners (fig. 4) are regenerative argands, the construction of which needs no special description. An improved ventilator, shown in fig. 5, is also a part of this system. The burner is completely inclosed from the air by the hemispherical globe *G*, which opens in the manner shown in fig. 3. Considerable care and experimenting has been necessary to proportion all the air passages that so large a flame should be entirely free from all flickering, but the arrangement adopted, shown so clearly in fig. 2 as to need no further description, appears fully to accomplish this. The extension chimney *B* is of porcelain, and the reflecting shade *D* is "opalized." The arrows show the

direction of the air-currents and how the heated and vitiated air passes out of the car. The lamp is lighted simply by lowering the globe as in fig. 3, turning on the gas, raising the chimney slightly and applying a match. Each fixture has a separate key, and it is not necessary to light all the burners, as each fixture is independent, and one or all can be lighted at pleasure.

To obviate the injurious effect of winter weather, the carburetter is surrounded by a wooden casing, leaving sufficient free space to allow a heater pipe, connected with the hot-water pipes of the car, to be run around it, as shown in figs. 5 and 6. In this way the apparatus is made to act perfectly well in the severest winter weather, as experience in the past winter is claimed to have shown. A device has also been

contrived by which the carburetter may be kept warm in winter on cars heated with stoves, and drawings and description of this will be published later.

In the fundamental features of this device, producing an illuminating gas by saturating air with the vapor of the volatile products of the distillation of petroleum, it will be recognized that there is nothing either novel or doubtful. An immense number of fixed plants, operating upon precisely the same principle, are in successful use throughout the United States. The great majority of the larger country hotels, hundreds if not thousands of private residences and not a few large establishments in cities supplied with gas works, are lighted in this way with satisfactory results. The novelty lies in the peculiar devices nec-



PASSENGER ENGINE, BELGIAN STATE RAILROADS.

essary to apply the same system to cars. The existence of a compressed air supply on every passenger car at once removes one difficulty and much simplifies the problem. The peculiar construction of the carburetter at once removes the next most serious difficulty, of eliminating the effect of the motion of the car and avoiding the danger of a loose supply of inflammable liquid.

Passenger Engine, Belgian State Railroads.

We publish this week illustrations of a fine passenger engine designed for the Belgian State Railroads, by Mons. M. L. Bika, Engineer-in-Chief, and constructed by MM. Carels Frères, Ghent. Our engravings originally appeared in the *Portfeuille Economique des Machines*, and we are indebted to *The Engineer* for the following description of these engines, which present many novel features. While the cranked axle, the inside cylinders, and outside crank arms for the coupling-rods are doubtless objectionable, the outside frames permit of a wide fire-box and large area of grate, and the bearings and springs are very accessible.

Four-coupled locomotives, with drivers 6 ft. 6 in. in diameter, have been used for many years on the Belgian State Railways with great success. They run very steadily, and easily take trains of fifteen coaches, weighing about 336,000 lbs. at 46 miles an hour. Higher speeds becoming necessary, M. Bika has designed the engine we illustrate. He has endeavored to depart as little as possible from the type which has done such good service. The engine is carried on six wheels, of which the four drivers are 79 in. in diameter, and the leading wheels are 47 in. in diameter; the frames are outside, but to give longitudinal stiffness, a centre frame made of two plates braced together is employed. This central frame is a great favorite with continental engineers, and is said greatly to promote the longevity of the crank shaft, which it prevents from "whipping" under the fore and aft efforts of the pistons. The central bearing is fitted with a spring, but it only carries a small part of the load. As the cylinders are inside, 1 ft. 8 3/4 in. centre to centre, it is claimed that the centre bearing takes nearly all the fore and aft strain, the outer bearings doing the propelling of the engine and train.

Owing to the position of the side frames, a wide fire-box is possible. It measures inside 3 ft. 6 1/2 in. by 10 ft. The grate surface is about 35 sq. ft. A very large surface is found necessary to burn the poor small coal used on the Belgian railways. The firebars are of wrought iron, rolled to the proper section and cut off in short lengths. The bars are 2 in. deep, and the top next the fire is 1 1/2 in. wide, the air space being 1 1/4 in. The bars are laid side by side, riveted together in groups of ten, and placed in the grate.

The valve gear is constructed on Walshaert's system. The annexed diagram will make the arrangement clear.

In this diagram *A B* is the valve-rod, *C D* the piston-rod, *E* the centre of the crank-shaft, *F* the centre of the eccentric, *G H* the eccentric rod, *H* the centre on which the fixed link swings, *I J* the valve rod connecting rod, *K L* is the rod carrying the outer end of *I J*, and moving it up and down in the link according as the engine is running forward or backward; *M* is the weigh shaft, *A J N* the lever whose action gives lead to the valve. The valve-rod is guided by a crosshead of aluminium bronze, which is said to answer admirably for this class of work.

The piston-rod crosshead moves in four-bar guides, the gudgeons being placed below the centre line in order to leave

the crosshead pin clear and to permit the small end to be forged solid in one piece with the connecting rod. The same end might, however, have been attained without carrying the crosshead gudgeons below the centre.

Reversing is effected by steam gear—two cylinders are

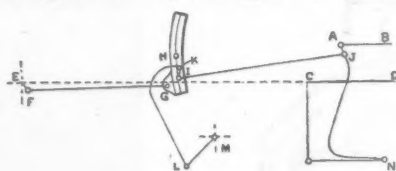


Diagram of Valve Gear.

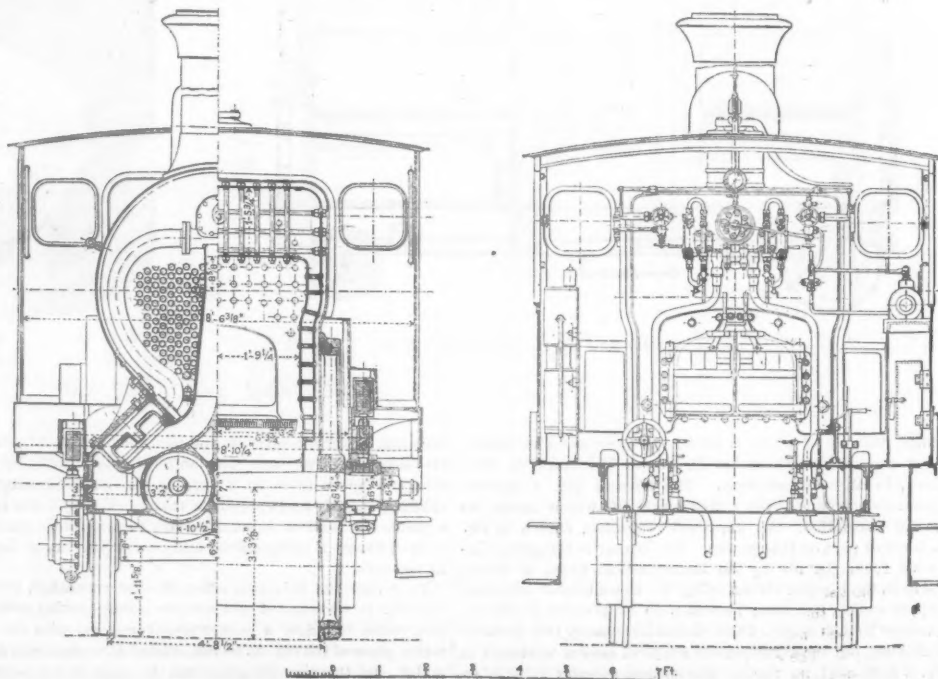
used, one a cataract filled with oil or water. By closing the bypass cock of the cataract the valve gear can be held in any position required. The slide valves are of the Allen or double-ported type.

The wheel base being nearly 17 ft., the engine runs very

steadily. To enable it to get round curves, the leading axle-boxes have lateral play under inclined planes.

The springs are peculiar. The springs of the front wheels and of the main drivers have each sixteen leaves 4 in. wide and 0.47 in. thick; they are 4 ft. 11 in. long centre to centre. They are made without any camber, and when the load comes on them they assume a reversed curve, falling at the ends and rising in the middle. It is claimed that this mode of construction is cheaper, the steel being merely cut to length, heated and tempered at once without requiring any preliminary bending and blocking. The hind driver springs are the same, except that they have seventeen leaves. The central spring in the middle bearing of the crank axle is 2 ft. 6 1/2 in. long, and has six leaves 4 in. by 0.23 in. It has a camber before being loaded of 0.6 in. The front and main driver springs have a flexibility of 0.67 in. per ton; the hind driver springs of 0.63 per ton. The central spring has 0.82 in. per ton; compensating beams couple the front and main driver springs. The distribution of the load is effected by shortening or lengthening the thrust bars between the spring stirrups and the axle-boxes; all the boxes are of phosphor bronze, each in one piece.

The boiler is fed by two vertical injectors. The fire-box is of copper, the tubes of brass. The outside fire-box plates are



PASSENGER ENGINE, BELGIAN STATE RAILROADS.

0.511 in. thick, and the barrel .53. The engine is fitted with the Westinghouse brake, which applies eight blocks to the four driving wheels.

The accompanying table gives the principal dimensions of the engine we illustrate and those of its predecessors:

	New type.	Old type.
Diameter of piston	17½ in.	16.92 in.
Length of stroke	24 in.	22.0 in.
Distance centre to centre of cylinders	20½ in.	20.9 in.
Diameter of drivers	79 in.	79 in.
" leading wheels	47 in.	47 in.
Wheel base	16 ft. 11 in.	15 ft. 3 in.
Length of grate	15 in.	103 in.
Width	43½ in.	42 in.
Length of fire-box inside	10 ft.	8 ft. 10 in.
" boiler barrel	10 ft. 6 in.	9 ft. 11 in.
Mean diameter	51 in.	50 in.
Height of centre above rail	7 ft. 7 in.	7 ft. 3½ in.
Boiler pressure	142 lbs.	120 lbs.
Length of tubes	11 ft. 6 in.	10 ft. 2 in.
Diameter " outside	1.77 in.	1.77 in.
Number " "	28	208
Heating surface of fire-box	136 sq. ft.	114 sq. ft.
" tubes	1.179	.855
Total heating surface	1,305 sq. ft.	969 sq. ft.
Weight of engine, empty	82,900 lbs.	69,400
" full	91,400 lbs.	78,500
Weight on front wheels, full	27,100 lbs.	20,400
" main drivers	32,200 lbs.	30,000
" hind drivers	32,100 lbs.	29,100

The engine was exhibited at the Antwerp Exhibition last year, and is described as being of excellent workmanship, being well finished and neatly designed, and doing heavy work on very inferior fuel.

Contributions.

The New York Railroad Commission and the Arbitration Bill.

Board of Railroad Commissioners,
ALBANY, March 20, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of March 19 occurs the following editorial notice:

"The New York Railroad Commission has recommended to the Legislature to pass a law empowering the Commission to investigate disputes between railroad companies and their employees, and providing that its findings and recommendations shall be held *prima facie* just and reasonable in proceedings to be brought at the request of either party by the Attorney-General in the Supreme Court, to have such recommendations entered as the judgment of said court." We do not understand that the decision of any court in Christendom that any given rate of wages, or hours of labor, or method of discipline is just and reasonable would compel any one to accept or give such terms; but we suppose that the purpose of the act is to make the railroad companies do what the Commission should recommend in such cases. The trouble with any such arrangement is that only one party could be bound by it—the railroad companies. No power on earth could make men work for them if they did not wish to."

The bill recommended by the Board to the Legislature did not contain the features you criticize. Those features were contained in a measure presented to the Board for consideration, but were *stricken out before recommendation to the Legislature*. A copy of the bill as recommended is inclosed herewith.

Will you give the same prominence to this correction that you did to the incorrect statement of fact?

WM. E. ROGERS, Railroad Commissioner.

[The following is the bill actually recommended by the Commission.]

An act to provide for the adjustment of grievances and disputes that may arise between common carriers and their employees.

SECTION 1. Whenever a dispute or grievance shall arise between a railroad corporation, owning or operating a railroad in this state, and its employees, it shall be the duty of the Board of Railroad Commissioners, upon the joint request in writing of the railroad corporations and such employees, or of any association or organization representing such employees, to investigate the said dispute or grievance upon due notice to the parties thereto, or their representatives, and to prosecute such investigation with all the powers conferred by law upon said Board.

Said Board may likewise hold such an investigation at any time upon its own motion if it deems it to be for the public interests.

SEC. 2. The findings of fact and the recommendations of said Board shall be served personally or by mail upon the parties or their attorneys, as soon as such decision can be made after the close of the investigation, and they shall likewise be transmitted to the Attorney-General for his consideration and action.

SEC. 3. The provisions of this act shall apply to all railroads and railways, and the corporations, receivers, trustees, directors or others owning or operating the same in this state, and their employees, and also to all sleeping and drawing-room car companies or corporations, and to all other associations, partnerships, companies or corporations engaged in transporting passengers or freight upon any railway in this state as owners, lessees or otherwise, or their employees.

SEC. 4. This act shall take effect immediately.

Live and Dressed Beef Shipments.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Feb. 26, page 148, you have an able editorial on "Dressed Beef and Live Stock Shipments." Will you permit one whose business it is to breed and raise the animal used for beef, to give his views upon this matter? If you will pardon me, I will in the first place say I fail to see what the price paid for the shipment of live stock has to do with that paid for dressed beef in cold cars, any more than it does with that paid for poultry, or eggs, or for butter. In years past, when we farmers first opened up our farms here in the West, wheat was our main article to send to Eastern markets. By and by capital and enterprise utilized our water-power and our abundant coal fields, and now we send that wheat in flour. Must the former rate on the wheat in bulk govern the rate on the manufactured product?

For many years we sent corn to your Eastern markets,

paying for freight a very large per cent. of its value. Now we condense that corn into butter, wool, pork and beef, etc. Must we pay the same per cent. of the cost on these articles as we did on the corn?

Inventive genius and enterprise have given to us a method by which we of the great producing regions can send to our cousins in the East—the consumers, whose name is legion—cheaper, healthier and better beef than by the old way. Now, shall a few men "of great wealth and influence," who have fattened on handling the products of our labor, take it upon themselves to say that we shall not avail ourselves of these new appliances?

But back of all this there are to us all patent reasons why we insist that dressed meats shall go forward over transportation lines at freight rates based on its own merits, the same as flour, butter, wool, or any other product of our farms. We farmers think it not at all to our discredit to be interested in the comfort or discomfort of the animals we raise. As we watch from day to day, and from weeks to months and years, the developing, growing and matured steer, there grows up a feeling very near to affection toward the animal that has commanded so much of our time and care. The torture these animals must endure in the long journey from our pastures and feed yards to the slaughter pens of the Eastern cities has always been a source of keen regret to every lover of a good animal.

We have hailed the advent of dressed beef shipments as a God-send to these to us almost half-human individual inhabitants of our farms.

The avarice of a few "men of great wealth and influence" can never long keep back this humane way of sending food to the consumer.

There are too many interested in this method to long prevent its universal adoption. The stock-raisers of the West and the consumers of the East, whose interests are identical, can with united influence in a short time crystallize their wishes into a national law forbidding the moving of animals designed for meat food any great distance on railroads.

Again, it must be admitted by all that the meat of beef animals slaughtered after a week's torture necessarily incident to a ride in a car from here to the East—nervous, frightened, bruised, half-starved and thirsty—cannot be as healthy nor as good as sent forward here and the quarters hung up in cold cars and sent forward in this way. No, Mr. Editor, it is useless to attempt to stem the tide of these mighty improvements in the onward course of events.

Slaughter houses will not only be sustained in Chicago for this purpose, but they will spring up all over the great feeding grounds of the West. Steaks and roasts for the tables of the New England and Eastern consumers will be cut from the quarters of beef killed west of the Mississippi River.

We of the West care nothing about the strife between the different cliques in Chicago—the live stock shippers on the one hand and the dressed meat men on the other, only as they have an influence upon the price and comfort of the cattle we raise. We cannot conceive of a shadow of reason why men who have been shipping live stock should have one word to say as to what the rate shall be on a car-load of dressed beef. I may wish to send to New York or Boston from my farm here in Iowa, and with us will be the universal sentiment of the intelligence of the nation. It is a humiliating spectacle to see great railway corporations so under the control of a small clique of live-stock breeders and speculators as to lose sight of the great object and ends for which they have been brought into being, viz., to be the great mediums or instruments of exchange between the producer and consumer, and that, too, without pandering to the interest of any that might wish to stand between. The shipping of live stock long distances for slaughter is as surely to be relegated to the things of the past as were the sickle, the scythe and the old wooden mold-board plow (all of which the writer has used in their time and called good, but now rejoices in better things)—no matter how much may shrink the values of stock-yard stocks, or blighted the expectations of a few Eastern butchers.

To conclude, allow me to repeat: Shipping dressed beef from near the feeding grounds saves:

1. An untold amount of suffering.
2. It gives healthier meat to the consumer.
3. It gives cheaper meat.
4. It gives tenderer meat.
5. It gives meat better in every respect.
6. It gives better prices to the producer.
7. Both the producer and consumer have a right to the benefits of the progress of the age.
8. Hence no one man nor small set of men have any right to intervene.
9. It is against public policy for common carriers to be so controlled as to sacrifice the public good for the few.

L. S. COFFIN.

FT. DODGE, IOWA.

[To much of what Mr. Coffin says we take no exception. It would neither be right nor expedient for the railroads themselves to attempt to destroy the dressed beef business, and no action which they may take which, however intended, has that effect, can be maintained. The rate of March 1, however, was, as we have said, the lowest rate on dressed beef ever made, except the rates of railroad wars.

As for the difference between the beef and cattle rates, it must be remembered that the lines do not all stand alike as to the circumstances. To some it is probably a matter of indifference whether they carry beef or cattle; that is, they would get as much of the business in one shape as in another. But on other

lines a very large part of the traffic is of cattle grown out of the reach of the places whence dressed beef is shipped. If these cattle go to market at all, they must go as cattle. Rather than lose this traffic altogether, the carriers will and have a right to accept any rate that will leave them any profit whatever, be it ever so much less than the profit other roads get on dressed beef. Further, in reckoning the profits it must be remembered that it is better to get 1 per cent. on the investment in stock cars, stock-yards and other appliances for carrying live stock than not to have them used at all, and so get nothing for them. It is contended, however, by some that the present difference in rates is not equal to the difference in cost. That is a question that we do not pretend to decide. The whole subject is a very complicated one, as any one who has seen the evidence and arguments in the case cannot but see. Nor do we contend that the difference in rates lately made is the proper one; so little experience had been had with any *maintained* difference in rates that it is not easy to say what is the effect or the profit at any given rates.

Judging solely by the statistics of the trade, cattle for the Eastern market from that part of the country west of Chicago and St. Louis are already chiefly carried from the last-named places in the shape of beef, and will be more and more hereafter; but the indications are that there will be but few places where they will be slaughtered, and few establishments engaged in the business; those who do the business on a small scale apparently are unable to compete with those who do the business on a large scale. Cattle grown or fattened further east seem likely to be forwarded alive, as heretofore.

The course of the business heretofore indicates this, though the advantages of slaughtering before shipping are probably not so great as are claimed. At least, the dressed-beef shippers urged as one of the reasons why the difference between the beef and cattle rates should be small, that they have to accept a cent a pound less for their meat than is paid for beef slaughtered in New York, which would hardly be the case if the consumers found it "healthier," "tenderer" and "better in every respect"—which does not concern the carriers particularly, however.

What we have contended for is that in this matter, complicated in its nature, and in which great individual interests contend fiercely on either side, the railroad companies have taken exceptional pains to arrive at a proper decision, hearing all interests and submitting the decision to men entirely disinterested, exceptionally qualified to judge, and of the highest character.—EDITOR RAILROAD GAZETTE.]

Railroads in China.

Secretary Bayard recently sent to the House Committee on Foreign Affairs the following letter from Minister D. nby on the effect of the annexation of Burmah and the establishment of overland routes to China in relation to the building of railroads:

The annexation of Burmah by Great Britain gives new interest to the railroad question in the Far East and the establishment of overland trade routes with China.

Three great European nations have been gradually carrying their frontiers nearer to China. Russia has been pressing forward from the north and west by annexing the banks of the Amur and a large portion of Kirin, which makes her continuous with Corea, on which latter country she is also supposed to have designs, and by the position she holds at Kashgar and at several other points in the west of the new dominion.

France comes next in the field from the south, and hopes that she may establish her supremacy in Tonquin, and open to her commerce the Red River and acquire the trade of Western China.

England, which seemed the last in the field, has by a bold stroke of policy assumed the foremost place, and acquired, by the annexation of Burmah, the only trade route existing between Southern Asia and China—viz.: the Irrawaddy and Bhamo route, and makes still more probable the eventual building of a railroad connecting British India with China.

Russia, in the meanwhile, is pushing on, at the rate of several miles a day, her Central Asian railroads, which will shortly reach Merv, and in the near future Kuldja, thus greatly facilitating the defense of her immense frontier. But the project which concerns her ultimate prosperity most nearly is the system of Central Asian railways designed by M. de Lesseps. This line, destined to unite the extreme west of Asia with the extreme east, starts from Astrakhan, passes through Khiva, Bokhara, and Samarcand into Chinese Turkestan; touches at Tang-Kissar, Kashgar, and Yarkand; skirts Lake Lob, and thence through outer Kansule, down to the Kan Valley, to find its terminus in Wuchang or Kankow. The military railroads already established or in construction by Russia are partly carrying out this gigantic scheme, and if the words of Tso Tsung Tang on the pressing necessity for China to establish in the near future a railway to her north-western frontier be borne in mind by China, a colossal railway system may be established sooner than we expect.

In this connection it may interest the department to know that Gen. James H. Wilson, who at the request of Li Kung Chang, has been examining the country near Tien-Tsin in view of the ultimate establishment of railway communications, left for Chin-kiang, by way of the Grand Canal, to report on the practicability and cost of a railroad along this line, and also on the condition and necessary work to be undertaken to control the Yellow River. Gen. Wilson has with him several able surveyors, and was offered a military escort by the Viceroy, which he, however, declined.



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

EXPERIMENTS ON TRAIN RESISTANCE.

The December issue of the *Journal of the Association of Engineering Societies* contains an interesting paper by C. H. Hudson, read before the Western Society of Engineers, on some experiments by the velocity method to determine the average rolling resistance in service of complete trains of engines and cars. Such experiments on complete trains, including the resistance of both engines and cars, are rare. Those in question were made by acquiring a certain speed (determined by observing with a stop-watch the number of seconds in passing a base of 200 to 400 ft., at the end of which steam was shut off), and then observing how far the train ran until stopped by the combined action of gravity and the rolling resistance. The energy corresponding to the initial speed being known or readily determined, and likewise the amount of energy destroyed by gravity, the difference between the two affords a ready means of determining the frictional resistance.

This method is not only one of the simplest for determining resistances, but it is also one of the most accurate and positive, and it has the great advantage over the dynamometer of including with the train resistance that of the engine as well, including its head resistance and internal frictional resistances, which the dynamometer never does, as ordinarily used. The internal engine friction, indeed, is not the same as, and no doubt considerably less than when the engine is running with steam, there being, for instance, no pressure in the steam-chest to cause slide-valve friction; but the difference in this respect, if it be borne in mind, does not detract greatly from the value of the experiments. On the other hand, there is the disadvantage that experiments made in this way do not afford direct evidence as to the resistance of trains in motion at uniform speed, as does the dynamometer, but comparisons of stops made at various speeds eliminate this advantage, and the superior precision and certainty of the method (assuming the speed observations to be accurately made) and the inclusion of all resistances in one result, make it as much better, for most practical purposes, as its simplicity makes it more convenient.

We recall no tests on the total resistances of entire trains as complete as these, which gives them very great interest, since, so far as they go, they give very positive testimony. It would possibly, however, bring out evidence of much practical value if a considerable body of such tests could be accumulated, especially for passenger train stops at high speeds, and with engines alone, and if it were generally understood how very easy it is to make and compute such tests, no doubt many more would be made. As, moreover, Mr. Hudson's computations contain two minor errors which somewhat vitiate his results, we may illustrate the proper manner of making these computations by recomputing his tests, afterward summarizing their indications.

In the *Railroad Gazette* of May 15, 1885, under the head of "The Computation of the Efficiency of

TABLE OF THE TOTAL ENERGY OF POTENTIAL LIFT IN VERTICAL FEET IN TRAINS MOVING AT VARIOUS VELOCITIES. Including the Effect of the Rotative Energy of the Wheels for Passenger or Loaded Freight Trains, assumed at 6.14 per cent. of the total energy. For trains of empty flat or coal cars add about 4 per cent. to the quantities below, and proportionately for mixed trains.

MILES PER HOUR.	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
0	0.00	.04	.04	.10	.14	.18	.25	.32	.39	.46	.53	.61	.68	.75	.82	.89	.96	1.03	1.10	1.17	1.24
10	3.55	.75	4.80	.81	5.11	.89	6.09	.96	6.96	1.03	7.99	1.10	9.09	1.17	10.26	1.25	11.50	1.33	12.82	1.38	14.19
20	14.20	1.47	15.67	1.52	17.19	1.60	18.79	1.67	20.46	1.74	22.20	1.80	24.00	1.88	25.88	1.95	27.83	2.08	29.86	2.16	31.96
30	31.95	4.17	34.13	4.23	36.35	4.31	38.60	4.38	41.04	4.45	43.49	4.52	46.01	4.59	48.60	4.66	51.26	4.74	54.00	4.80	56.80
40	56.80	2.88	59.68	2.94	62.69	3.03	65.94	3.09	69.33	3.16	72.86	3.23	76.53	3.30	80.33	3.37	84.19	3.45	88.24	3.51	92.40
50	88.75	3.59	92.34	3.65	96.00	3.73	99.72	3.80	103.52	3.87	107.39	3.94	111.33	4.01	115.34	4.08	119.42	4.16	123.58	4.23	127.80
60	127.80	4.30	132.10	4.36	136.45	4.44	140.90	4.51	145.41	4.58	149.99	4.65	154.61	4.72	159.36	4.79	164.15	4.87	169.02	4.93	173.95
70	173.95	5.01	178.96	5.07	184.03	5.15	189.18	5.22	194.40	5.29	199.69	5.36	205.05	5.43	210.48	5.50	215.98	5.58	221.55	5.64	227.18

$$\text{Formula: Vel. head} = \frac{v^3 \text{ in ft. per sec.}}{64.32} = \frac{1,467^2 V^2}{64.32} = 0.033445 V^2$$

$$\text{To which add 6.14 per cent. for rotative energy of the wheels} = 0.002055 V^2$$

$$\text{Giving as the final formula, by which the table is computed, Vel. head} = 0.035500 V^2$$

Brakes," we gave at some length the simplest method for computing the efficiency of brakes in making stops. As the method described was general for any retarding force whatsoever, it is, of course, equally applicable to cases where the only "brake" is the retarding friction of the train itself, and we need not repeat the details of the method further than to say that a body moving through space in any direction, with any velocity whatsoever, has in it a certain amount of stored-up energy which may be expressed in the form of the number of vertical feet through which it would suffice to lift the body vertically against the action of gravity; in other words, it has what we may call a certain "velocity head," which is always the same at the same velocity, whatever the weight of the body, and may be precisely computed and tabulated. Such a table, repeated from our former article, is given below. As no similar table, nor any convenient substitute therefor, is to be found in print elsewhere, it may prove useful to those who are disposed to make similar tests on other trains.

The two minor errors referred to, which would not ordinarily make any great difference, but in these particular tests are of some importance, are as follows:

First, the rotative energy of the wheels, which is in addition to that due to the linear velocity of the trains, is not included, and this, although only amounting to some 6 or 8 per cent. of the linear energy, makes considerably more difference than that in the computed resistance.

Secondly, the element of time of the stop was taken into account, which is incorrect. In any body acted on by uniform accelerating or retarding forces, the time, space fallen through and velocity acquired bear a certain constant relation to each other, so that, any two being given, the other can be determined. But if the accelerating or retarding force be a variable one, the ratio of the time to the other two elements will not be constant, while the ratio of the distance moved through and the velocity will be in no way affected, if the average of the accelerating or retarding force be the same. The retarding resistances of a train which is gradually coming to rest are pre-eminently variable forces, and hence the only elements which should properly have been considered are: Initial velocity in miles per hour; length of stop, and amount of grade or wind resistance other than the rolling friction. Not even the weight of the train needs to be known. In these experiments there was no sensible wind resistance, and no great amount of grade resistance.

The train experimented with consisted of an ordinary American 17 x 24 in. engine, followed by 15 loaded gondola cars, averaging something over 24 tons each. The process of computation, by the aid of the table below, is as follows:

1. Experiment.	1	2	3	4	5	6
2. Initial velocity, miles per hour	11.70	9.43	6.81	7.70	10.65	11.33
3. Vel. head (from table)	4.87	3.17	1.65	2.10	4.027	4.57
4. Less rise of grade	2.97	1.76	.62	1.048	2.48	3.21
5. Vel. head consumed by friction	1.90	1.41	1.03	1.052	1.547	1.36
6. Dist. run (100 ft. stations)	5.38	4.03	2.34	3.16	4.55	3.21
7. Equiv. grade to resistance of friction = net vel. head	.353	.333	.441	.333	.313	.424
8. Equal resistance in lbs. per ton of	7.06	7.06	8.82	6.66	6.26	8.48
9. As computed by Mr. Hudson	5.98	6.45	8.09	5.95	5.38	6.55

These experiments were all made with the same train, time and conditions, in close succession to each other. All the others were made with a different train and at different localities.

When, as is usually the case, the entire stop takes

place on a uniform grade, the process is still further simplified into the following formula:

$$\text{Vel. head} = \text{grade of retardation, which} + \text{or} - \text{rate of actual grade} = \text{equiv. grade to resist. of friction.}$$

The computation below gives all the work of determining the resistance of the remaining 16 observations, except the bare process of dividing, which in this case, as it happens, was done with a slide rule, without numerical work:

1. No. of exp't.	8	9	10	11	12	13	14
2. Vel.	12.08	7.82	6.73	6.04	7.57	7.63	12.17
3. Vel. head	5.18	3.27	1.605	1.30	2.035	2.07	5.26
4. Rise	1.082	0.104	0.00	0.00	0.00	0.00	2.88
5. Net head	4.098	2.166	1.605	1.30	2.035	2.07	2.38
6. Distance	15.00	12.72	10.13	5.92	10.79	9.95	8.47
7. Equiv. grade	.273	.172	.159	.220	.191	.224	.282
8. Lbs. per ton.	5.46	3.44	3.18	4.40	3.82	4.48	5.64
1.	15	16	17	18	19	20	21
2.	10.63	11.96	10.65	5.35	5.11	6.56	7.73
3.	9.82	5.08	3.59	1.009	0.93	1.52	2.12
4.	4.31	2.92	2.16	0.42	0.35	.80	1.154
5.	5.51	2.16	1.43	0.588	0.545	0.72	0.986
6.	19.82	8.70	6.70	1.91	1.79	3.05	4.05
7.278	.248	.213	.398	.305	.237	.230
8.	5.50	4.96	4.26	6.16	6.10	4.74	4.78

The coincidence between the results of these 22 different tests is, when fairly considered, an extraordinary proof of the essential accuracy of the method, and when it is considered that the only apparatus necessary is a stop watch and a tape line to measure the distance run (for a base to observe the time may be obtained from any two telegraph poles) it indicates the utility of the method, which is equally applicable, of course, to increasing as well as decreasing speed, so that the work done by the engine may be measured. A possible source of error in the above tests is irregularities in the grade, since a few inches would, with the low speeds used, make an appreciable difference. But this is a minor difficulty, and with higher speeds or greater forces to be measured would almost disappear.

Classifying the tests according to the different pieces of track on which they were made, we obtain:

	Lbs. per ton.
Experiments 1, 2, 3, 4 and 5, on same stretch of 1 per cent. up grade, cars and engines in ordinary order, 3½ x 6½ in. journals, fair track, joints somewhat down, 6.26 to 8.82 lbs. per ton, averaging.....	7.17
Experiments 8 to 13, level track, of same class, different trains:	
Experiments 10 and 12, with favoring rear wind, av.....	3.50
Experiments 8, 9, 11 and 13, no wind.....	4.45, av. 4.13
Experiments 14, 15, 16, 17, 20 ft. up grade (av. speed, 12.85 miles per hour).....	5.10
Experiments 18, 19, 20, 21, 22, in same vicinity as above (av. speed, 6.20).....	5.57
Extreme fluctuation of experiments 8 to 22, 3.44 to 6.16 lbs. per ton.	

All the above were on a straight track. But one test, No. 6, was made on a 2-degree curve, which showed a resistance of 8.48 lbs. per ton, 1.31 lbs. per ton in excess of the average of tests 1 to 5, near the location of which the test occurred, and 3 lbs. or more over the average of the other tests.

It is greatly to be regretted that more curve tests were not made, at various speeds, with which the above could be compared. It is useless to attempt to draw any further conclusion from this single test than the indication it affords of the accuracy of the method.

The discrepancy between the average results at the three different localities (the tests at the same localities closely corresponding) is probably chiefly due to differences in the condition of the track, although both engine and cars were different.

As respects the effect of speed we have confirmatory evidence in these tests that the general law that the resistance increases when the speed is very low is a true one, as also that the increase is such as to appreciably affect the average resistance during a stop or (what is more to the purpose) during a start. The average speed of each test is, of course, about half the initial speed. This being so, we find by comparison of tests 14-17 and 18-22 that decreasing the aver-

age speed from 6.4 to 3.1 miles per hour increases the resistance from 5.1 to 5.57 lbs per ton. In tests 1-5, on different ground, an average speed of 3.4 miles per hour showed the highest resistance, 8.82 lbs. per ton, and an average speed of about 5½ miles per hour (averaging tests 1 and 5) showed the lowest, 6.66 lbs. Similarly, test 8, averaging 6.04 miles per hour, shows about 1 lb. per ton less resistance than tests 11 and 13, averaging 3½ miles per hour. This coincides with much other evidence to indicate strongly that during the first few hundred feet of a run the resistance is very materially greater than afterwards, a fact which it is desirable should be definitely determined, as it may in part be remedied by the grades.

The labor and expense of making some more extensive tests of this kind, with various cars and loadings, on different kinds of track and alignment, and at different speeds, would not be great, and some important practical questions might be settled thereby, as effect of tight and loose coupling, overloading, degree of curve, speed on curve and on tangent, amount of wind and oscillation resistance, etc. It is to be hoped that some one may make them.

Effect of the Fall in Rates of Interest on Railroad Securities.

The recent retirement of maturing 8 per cent. bonds by 3½ per cent. Illinois Central bonds sold at par, has led us to comment on the advantage of such good credit to that company. It, however, is not in position to gain as much by the reduction in the current rate of interest as some others may do. The advantage of commanding capital for 1 or 2 per cent. less than one's competitors have to pay is greatest where there is a great territory to be occupied by railroads, and is perhaps best illustrated by the Chicago, Burlington & Quincy west of the Missouri, which pays 4 per cent. on some bonds while the Union Pacific pays 6 per cent. and the Chicago & Northwestern about 4½ per cent. (6s due 1933 selling at 124). Of course, an unlimited use of such credit would soon spoil it. To have it, it is indispensable that the larger part of the value of the property should be represented by stock.

Another corollary of the general reduction in the rate of interest is that railroads whose whole cost is represented by bonds, or rather the whole, or nearly the whole, of whose net earnings is required to meet their fixed charges—having little or no surplus for dividends—must inevitably find it very hard to keep their heads above water. On the average and in the long run, railroads, like other business enterprises, will be able to earn net only about the average rate of interest current in the community where risks are similar. When one has paid 7 per cent. and just earned it, if the general rate goes down to 5, it is not likely long to be able to earn 7. Competitors will come in; neighboring lines, formerly too distant to affect its business much, will build branches to tap its chief traffic centres, and with lower rates will have as large a surplus. Now, if the capital on which the high interest has been earned and paid is all bonds, a falling-off of income means bankruptcy. There are tens of thousands of miles of railroad in this situation, never earning anything for their stockholders, and unable long to endure a reduction of 1 per cent. or so in the rate of interest on their cost which they are now earning.

And dividend-paying companies whose fixed charges, at 6, 7 or 8 per cent. interest, form a very large part of their net earnings, must feel this reduction in the prevailing rate of interest also, though in their case it will be felt only in a reduction in the average rate of dividend, which, if the fixed charges are not too large a part of the net earnings, may only put the stockholders on an equality with other capitalists, leaving their stock worth as much as ever, though it yields a smaller income. Instances of this kind have already occurred, and more of them are likely to occur. Stocks paying 8 per cent. a few years ago have dropped to 5, and are now nearly as high as ever.

Of course some companies will continue to earn much more than the average rate of interest, and some may suffer a considerable reduction in profits without reducing dividends, because they have not heretofore divided all they earned, in some years not much more than half as much. And it is not to be forgotten that there are many companies whose properties cannot be replaced for nearly as little as their capital accounts, and can pay high interest on their securities from profits which are too low a rate on their cost to tempt competitors. Many, again, will soon be able to retire the bonds which pay high interest, and of course will pay only the current rate on those which replace them. The Illinois Central's 3½s replace 6s, and such conver-

sions are going on all the while. But to companies which earn no dividends, and have had to pay nearly all their net earnings for fixed charges, the general reduction in the rate of interest is a serious matter. And generally, where bonds are not due for many years, the income of stock is likely to be unfavorably affected by the same fact, as it must bear the whole of the reduction in the net earnings.

Let us take as an example a road whose capital is \$50,000 per mile, half stock and half bonds, bearing 7 per cent. interest, which earns 7 per cent. on its whole cost:

Net earnings per mile	\$3,500
\$25,000 stock, paying 7 per cent	1,750
\$25,000 bonds, " "	1,750
\$50,000	\$3,500

A reduction to 5 per cent. on the average would give:

Net earnings	\$2,500
\$25,000 bonds at 7 per cent.	1,750
Balance	\$750

Equal to only 3 per cent. on the stock.

But on the maturity of these bonds suppose them to be retired by 4 per cents; then the 5 per cent. earned on the whole capital would yield \$1,500 more than the interest on the bonds (\$1,000), and this would be 6 per cent. on the stock, and make it worth decidedly more than when the current rate of interest was 7 per cent. But if the bonds are of long date, the stock must suffer seriously.

The reduction of profits on capital invested in business enterprises, like railroads, does not always follow immediately and to its full extent the fall in the rate of interest, but it follows, nevertheless, not in all cases, but, as we have said, in the long run and on the average. This rate is not the same, of course, as that on well-secured loans, but that prevailing for enterprises with similar risks. Something like 15 years ago it was as easy to earn 10 per cent. on railroad stocks as it is to earn 8 now—easier, probably. It may very well be that it will soon be as hard to earn 6 as it is to earn 8 now; and that will not be the worst of misfortunes, for a 6 per cent. stock is already worth about as much as an 8 per cent. stock was worth a few years ago. The serious suffering will be in cases where the present margin over fixed charges is small, the interest much higher than the current rate, and the date of their maturity distant.

Growth of Three Great Chicago Railroads.

The publication of the net earnings of the Chicago & Northwestern for the last seven months of the calendar year has enabled us to ascertain them for the entire calendar year for the last four years.

This enables us to compare the results on this road with those of its nearest rival, the Chicago, Milwaukee & St. Paul, and those of the system next south of it in Illinois, and next but one in Iowa, the Chicago, Burlington & Quincy, as follows:

Gross earn :	1882.	1883.	1884.	1885.
Chic. & N. W.	\$23,977,671	\$25,024,080	\$23,491,894	\$24,301,058
C. M. & St. P.	20,186,726	23,659,824	23,470,998	24,412,278
C. B. & Q.	21,550,805	26,110,369	25,483,612	26,556,425
Expenses :				
Chic. & N. W.	13,431,755	15,048,844	14,099,639	13,936,394
C. M. & St. P.	12,186,073	13,778,037	13,859,629	14,512,471
C. B. & Q.	10,968,341	12,780,630	13,072,504	13,992,823
Net earn. :				
Chic. & N. W.	10,545,916	9,975,182	9,391,959	10,366,664
C. M. & St. P.	8,200,653	9,881,787	9,611,369	9,900,807
C. B. & Q.	10,882,464	13,329,739	12,411,108	12,563,602
Miles :				
Chic. & N. W.	3,303	3,644	3,767	3,843
C. M. & St. P.	4,296	4,449	4,778	4,862
C. B. & Q.	3,099	3,355	3,399	3,500

Thus the Chicago & Northwestern's gross earnings have been almost stationary in the last four calendar years, being \$678,613 (3 per cent.) less last year than in 1884, though it has added 16½ per cent. to its mileage meanwhile. The Milwaukee & St. Paul has gained \$4,024,000 (20 per cent.), in gross earnings, with an increase of 13 per cent. in mileage, and the Burlington \$5,006,000 (23 per cent.) in earnings and 13 per cent. in mileage. The Burlington, however, made nearly its whole gain in the first year after 1882. In 1882 the Milwaukee & St. Paul earned \$3,591,000 less than the Northwestern; last year \$112,000 more, the gains in mileage having been nearly the same on both (564 and 540 miles). In 1882 the Northwestern earned \$2,427,000 more than the Burlington; in 1885, \$2,255,000 less.

In working expenses the Burlington alone shows an increase in proportion to its increase in mileage—an increase which has a very healthy look. The Northwestern, in spite of its great increase in mileage, did not spend much (3½ per cent.) more than in 1882; the St. Paul, 19 per cent. more. The result is that the Burlington has increased its net earnings 15½ per cent. since 1882, and the Milwaukee & St. Paul 20½ per cent.; while the Northwestern has suffered a slight decrease. Per mile of road the Burlington has

a long lead, earning net \$8,590 last year, against the Northwestern's \$2,698 and the St. Paul's \$2,036.

The Burlington's additions to its lines in this period have been chiefly in Nebraska, the Northwestern's in Wisconsin, Michigan, Iowa and Dakota, and the St. Paul's in Wisconsin, Minnesota, Iowa and Dakota. A considerable part of the St. Paul's new lines are placed where they divert traffic from old lines of the Northwestern, while its own and the Burlington's new lines are mostly in new country.

The St. Paul, notwithstanding its great gain, still has much lighter earnings per mile, gross and net, than the Northwestern, the gross last year being \$5,023, against \$6,323 on the Northwestern and \$7,588 on the Burlington; but the difference between it and the Northwestern is not nearly so great now as in 1882, when the St. Paul's earnings per mile were \$4,750, the Northwestern's \$7,259 and the Burlington's \$6,954. Then the Northwestern earned 53 per cent. more per mile than the St. Paul; last year only 26 per cent. more.

The Southwestern strike becomes more and more alarming, because it has been suffered to continue to prevent by violence the running of trains. It is not so much a strike as an insurrection, and everything connected with it has been dwarfed into insignificance compared with the defiance of the law which the community has permitted day after day and week after week, by what is comparatively a mere handful of men. No settlement should be possible until order is restored and all interference with the running of trains ceases. If it shall appear that by defying the law and taking possession of their employers' property men can gain an advantage for themselves, then not railroad property, but nearly all other property also, becomes worthless, and, worse, civilization itself is at an end. The situation is truly alarming. The men engaged in the obstruction of the railroads are hardly as much to blame as the communities who permit the violence. These men have at least once before tried the same policy of violence, and found it tolerated by the community, and gained their ends, if not in consequence of it, at least in spite of it. This to them was sufficient warrant for the legality of their conduct; for it is not the laws which are enacted, but those which are executed, which are really in force.

Meanwhile the position of the railroad managers is an extremely difficult one, for after all the violence and wrong they must work the roads with a similar force of men, composed largely, no doubt, of the men engaged in this strike, though, it is to be hoped, not including those who have taken part in the criminal acts by which the road has been obstructed; and they need to give these men courteous treatment and award them all their proper rights and privileges. The proper disposition for such treatment, it need not be said, is not cultivated by what is taking place on the Missouri Pacific at this time.

As we go to press news reaches us of the death at Thomasville, Ga., of Mr. A. N. Kellogg, the original proprietor and publisher of the *Railroad Gazette*, a man of many remarkable and admirable qualities; enterprising, wonderfully ingenious, warm-hearted, generous and of the strictest integrity. The present editor and publisher of the *Railroad Gazette*, formerly his employé, reckon it among the fortunate circumstances of their lives that they were once associated with him. But for him, probably the *Railroad Gazette* would never have existed.

Last week we criticised a bill proposing that the New York Railroad Commission should act as a board of arbitration between railroad companies and their employes, as apparently providing a policy which the companies could be forced to follow, but not their employes. Commissioner Rogers, in another column, writes to say that the bill which we criticised was not recommended to the Legislature, while another one, from which were omitted all the features which we criticised, and which seems to us wholly commendable, was recommended. The bill which we criticised was presented before the Commission, but not adopted by it, but in some way it was telegraphed to the New York papers, while the bill actually recommended was not, and we saw it first when communicated by Mr. Rogers. The Commission, it seems to us, deserves commendation not only for the bill which they recommended, but for rejecting the one first proposed, which we criticised last week.

The transcontinental rate war is developing new traffic movements. Corn has been shipped from Kansas City to San Francisco, where it is hardly known, California growing oats and barley for

feeding, but not corn. The distance is such that at a rate of 1 cent per ton per mile, which is below the average cost on the transcontinental lines, the freight would be about 60 cents per bushel, which is probably more than the grain is worth for feeding in California; but rates have been made since the war began which make it possible to sell corn for 65 cents in San Francisco, and 52 car loads were shipped thither in one day. In the other direction, oranges are coming from Los Angeles in unheard-of quantities. There has been heretofore considerable shipments of these, which was possible only because the fruit was very cheap in Southern California, selling for not half as much as in Florida; but the rates now made make it possible to introduce the California pretty well over the country, and not in the West only, which has been the chief market heretofore. The low passenger rates are bringing great numbers of persons to California, largely to Southern California, and the Californians naturally hope that many will be attracted by the country and settle there. On the other hand, old Californians are taking advantage of the occasion to visit their old homes in the East, but these are expected all to come back again.

The effect is greater than is usual in cases of railroad war, chiefly because the distance is so great, but partly also because the regular rates, especially the passenger rates, are higher than in most parts of the country where railroad wars occur. A reduction of the fare between New York and Chicago to a cent per mile reduces the price of a ticket less than \$11, because it was low before; but a cent a mile from Omaha to San Francisco brings down the price of a ticket from \$84 to \$18.65, and the saving in the round trip in the latter case is \$130, against \$22 in the former. In freight the differences are even greater in proportion. The difference between the standard rates and the lowest war rate on freight from New York to Chicago is but \$7 per ton; to California it is \$85 per ton. The northern transcontinental lines, to meet the competition of the "Sunset Route" (via New Orleans), have taken freight of all classes from New York to the Pacific coast for 75 cents per 100 lbs. (regular rate, \$5), though for the first-class freight they have to pay the trunk lines the whole of that amount for transportation to Chicago, so that they haul it the 2,357 miles (by the shortest route) from Chicago to San Francisco for nothing. All of which is very amusing—to the Californians; with the very important exception of the wholesale merchants there, who are said to have for the most part just about finished laying in their season's stocks when the war broke out and rates were reduced. The man who, having paid \$5 per 100 lbs. for the transportation of the goods which he sells, has to compete with another man who got his carried for 75 cents per 100, is very likely to have very decided opinions as to the evil effects of railroad wars on the community.

The reports of earnings for the early weeks of March in many cases show decreases, such as we have said were likely to occur because of the exceptionally heavy earnings last year in March, into which bad weather threw a good deal of traffic that otherwise would have been carried in February. Thus the Chicago & Alton last year earned \$143,529 more in March than in February, the excess in March in previous years having been \$70,800, \$129,300 and \$124,600; the Chicago, Burlington & Quincy earned \$1,087,195 more in March than in February, though in previous years the excess in March had been only from \$109,000 to \$785,000; the Milwaukee & St. Paul and the Northwestern also showed similarly exceptional earnings in March. So it is not evidence of a bad business when we find in the first week of March a decrease compared with last year of 7.3 per cent. by the Chicago & Alton, of 3.7 by the Northwestern, of 15.3 by the Illinois Central, of 14.4 by the Burlington, Cedar Rapids & Northern, and of 9.7 by the Louisville & Nashville; and in the second week a decrease of 11.7 per cent. by the Chicago & Alton, 9 per cent. by the Northwestern, and 14 by the Louisville & Nashville; while on the other hand such gains as are reported this year by the Milwaukee & St. Paul and the St. Paul & Omaha indicate a positively good business.

The British Board of Trade reports of exports unfortunately did not distinguish between steel and iron rails until 1877, but beginning with that year the exports have been, in tons of 2,240 lbs:

	Iron.	Steel.	Total.	P. c.
1877.....	176,229	234,481	410,710	43.0
1878.....	110,678	246,882	357,560	30.7
1879.....	55,904	328,425	384,329	14.5
1880.....	139,889	464,401	604,290	23.3
1881.....	119,886	594,419	714,305	16.8
1882.....	46,532	733,919	780,451	5.9
1883.....	25,000	748,509	773,509	3.2
1884.....	15,581	526,160	541,741	2.9
1885.....	14,642	482,669	497,311	2.9

Only a few years previous to 1877 the steel exports

were but a small fraction of the whole, but in that year they were already more than half of the total, and the iron exports for the last four years have been insignificant. The increase in iron exports after 1879 was due wholly to the suddenness of the demand for rails, which the steel works of the world at the time were unable to supply.

While the British exports do not closely reflect the world's consumption, as they used to do, the continent of Europe, except Spain and Italy in part, being chiefly supplied from Belgium, Germany and France, they still supply nearly all the non-European world, except this country, and this world—Mexico, South American countries, Australia, India, etc.—is precisely that where lines are most likely to have the light traffic for which iron rails might suffice. If steel rails were the cheaper for them, much more must they have been for the European railroads; notwithstanding which there are indications that some of them continued to buy iron long after its use was practically abandoned in this country, except by companies struggling to get their roads built at the lowest possible first cost, with little regard to economy in working, which continued to take iron so long as it was cheaper than steel.

Pennsylvania Railroad Earnings in February.

Pennsylvania Railroad earnings were exceptionally bad in February last year, but the gain this year on the lines east of Pittsburgh and Erie is so very great that the month is not only comparatively but positively an extremely favorable one.

For 10 successive years the gross and net earnings and working expenses of these lines east of Pittsburgh and Erie in the month of February have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1876.....	\$2,345,792	\$1,881,104	\$464,688
1877.....	2,165,699	1,461,646	704,054
1878.....	2,169,909	1,418,069	751,840
1879.....	2,538,039	1,965,053	572,986
1880.....	2,644,575	1,712,304	932,271
1881.....	3,065,594	1,937,510	1,128,084
1882.....	3,306,730	2,227,129	1,079,601
1883.....	3,712,195	2,375,521	1,336,674
1884.....	3,428,713	2,304,154	1,124,559
1885.....	3,077,680	2,247,211	830,469
1886.....	3,551,455	2,283,871	1,267,584

Thus, both gross and net earnings were larger this year than in any other except 1883, and but little less than then. Compared with last year the increases are:

Amount.	Gross earnings.	Expenses.	Net earnings.
Per cent.....	\$477,775 15.1	\$56,680 1.7	\$421,115 32.0

A gain of more than one-half in net earnings is great indeed, but these were extraordinarily small last year, and the comparison with the six years previous to 1885 shows that the average net earnings in them were \$1,184,031, against \$1,267,584 this year. This shows, however, a very satisfactory gain over the average of the most productive years.

No such improvement is shown by the lines west of Pittsburgh and Erie, though they did a little better than for two years previous. Their surplus or deficiency in meeting all liabilities has been in February:

Year.	Year.	Deficit	Surplus
1876.....	1883.....	\$35,730	\$98,526
1877.....	1884.....	133,243	145,692
1878.....	1885.....	165,022	205,180
1879.....	1886.....	100,197	101,947

These lines have not done unusually ill this year, but neither do they show so much improvement as the eastern system, the gain of \$103,000 being probably something like 15 per cent. of the net earnings of the system, while the eastern lines gained 52½ per cent.

February was much better than January for the eastern lines this year, while it was considerably worse last year; on the western lines the deficit was but slightly less in February than in January this year.

For the two months ending with February, for 10 successive years, the earnings and expenses of the lines east of Pittsburgh and Erie have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1876.....	\$4,793,477	\$3,562,864	\$1,230,613
1877.....	4,431,573	3,117,680	1,313,893
1878.....	4,559,206	2,936,107	1,623,099
1879.....	5,081,463	2,888,945	2,192,518
1880.....	6,028,126	3,429,646	2,598,480
1881.....	6,284,809	3,919,864	2,364,945
1882.....	6,680,051	4,526,184	2,153,867
1883.....	7,641,552	4,833,820	2,807,732
1884.....	7,000,946	4,710,251	2,290,695
1885.....	6,323,202	4,532,158	1,821,044
1886.....	6,970,990	4,751,865	2,219,125

Thus the gross earnings this year, though larger than last year, were less than in 1883 and 1884, and the net earnings, also larger than last year, were less than in 1880, 1881, 1883 and 1884, and but a trifle more than in 1879, the gain over last year being for the two months:

Amount.....	Gross earnings.	Expenses.	Net earnings.
Per cent.....	\$617,788 9.7	\$219,707 4.9	\$398,081 21.8

Meanwhile the surplus or deficit of the lines west of Pittsburgh and Erie has been:

Year.	Year.	Surplus	Deficit
1876.....	1883.....	\$125,897	\$123,274
1877.....	1884.....	434,070	256,271
1878.....	1885.....	546,229	247,987
1879.....	1886.....	57,449	281,654

Thus there has been but little change in the result for the last three years, in all of which it has been much less favorable than in any of the other five, while the difference between this year and 1881—a decrease of \$787,883—is more than half the average net earnings of the system for two months last year.

Adding the surplus of this system to or subtracting the

deficit from the net earnings of the Eastern system, we have as the income from both systems:

Year.	Year.	Year.	Year.
1879.....	\$2,318,415	1883.....	\$2,831,006
1880.....	3,032,530	1884.....	2,054,424
1881.....	2,911,174	1885.....	1,573,057
1882.....	2,066,418	1886.....	1,967,471

Thus, while the profit is much larger (27 per cent.) this year than last, it is less than in any of the other six years, and about one-third less than in 1880, 1881, or 1883.

February Accidents.

Our record of train accidents in February, given in full elsewhere, contains notes of 32 collisions, 61 derailments and 5 other accidents; 98 accidents in all, in which 21 persons were killed and 157 injured.

Five collisions, 9 derailments and 2 other accidents caused the death of one or more persons; 4 collisions and 15 derailments caused lesser injury to persons. In all 16 accidents caused death and 19 injury, leaving 63, or 64 per cent. of the whole number, in which there was no injury serious enough for record.

The 32 collisions caused 6 deaths and injured 30 persons; in the 61 derailments 13 persons were killed and 126 hurt; while in the 5 other accidents there were 2 persons killed and 1 injured.

Of the killed 19 and of the injured 58 were railroad employees on duty, that class thus furnishing 90½ per cent. of the killed, 37 per cent. of the injured and 44½ per cent. of the whole number of casualties.

As compared with February, 1885, there was a decrease of 118 accidents, of 23 killed and of 102 injured.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:		
Rear.....	21	
Butting.....	7	
Crossing.....	4	
	32	
DERAILMENTS:		
Broken rail.....	11	
Broken frog.....	1	
Broken switch-rod.....	1	
Spreading of rails.....	4	
Broken wheel.....	4	
Broken axle.....	4	
Broken coupling.....	2	
Accidental obstruction.....	1	
Cattle on track.....	1	
Wash-out.....	2	
Land-slide.....	2	
Snow or ice.....	8	
Misplaced switch.....	6	
Runaway engine.....	1	
Unexplained.....	11	
	61	
OTHER ACCIDENTS:		
Boiler explosion.....	1	
Broken parallel-rod.....	4	
	5	
Total number of accidents.....	98	

Of the collisions 5 were caused by trains breaking in two; 4 by misplaced switches; 1 each by snow, by a flying switch, by a mistake in orders, and by failure to use signals. One was maliciously caused, the train wrecker starting an engine which had been left alone on the track.

A general classification of these accidents is made as follows:

	Collisions.	Derailments.	Other.	Total.
Defects of road.....	17	11	5	33
Defects of equipment.....	5	11	5	21
Negligence in operating.....	24	6	1	31
Unforeseen obstructions.....	2	10	1	13
Maliciously caused.....	1	11	1	13
Unexplained.....	1	11	1	13
Total.....	32	61	5	98

Negligence in operating is thus charged with 31 per cent. of all the accidents, defects of road with 17, and defects of equipment with 21½ per cent.

A division according to classes of trains and accidents is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains.....	3	20	3	26
To pass. and freight.....	19	8	1	28
To freight trains.....	17	41	2	60
Total.....	32	61	5	98

This shows accidents to a total of 130 trains, of which 41 (31½ per cent.) were passenger trains, and 89 (68½ per cent.) were freight trains.

Of the total number of accidents 55 are recorded as happening in daylight and 43 at night.

The record is not different from that which might be expected in a cold and stormy February, although it is much below that of the very severe February of last year. A peculiarity of this season is that the snow-storms have generally extended further to the southward, leaving the far Northern lines comparatively free. The worst snow blockades this year were on lines not at all prepared for such a visitation, and it would seem that such roads were more liable to accident, although the case was really the reverse and the accidents were comparatively few. It is to be noted, however, that while February was a stormy month, the extreme cold and snow were varied by mild weather, and were not continuous as they were last year.

For the year ending with February the record is as follows:

	Accidents.	Killed.	Injured.
March.....	86	17	84
April.....	81	14	75
May.....	62	8	65
June.....	75	24	115
July.....	76	28	75
August.....	92	37	172
September.....	91	25	98
October.....	123	36	134
November.....	96	19	118
December.....	74	31	183
January.....	94	40	90
February.....	94	21	157
Total.....	1,048	300	1,336
Total, same months, 1884-85.....	1,295	379	1,871
" " " " 1883-84.....	1,545	435	1,918
" " " " 1882-83.....	1,895	394	1,680

The yearly average for the four years was 1,321 accidents,

377 killed and 1,664 hurt. The monthly average for last year was 87 accidents, 25 killed and 111 injured.

The averages per day were, for the month, 3.50 accidents, 0.75 killed and 5.61 hurt; for the year, 2.87 accidents, 0.82 killed and 3.66 injured.

The average casualties per accident for the month were 0.214 killed and 1.602 hurt; for the year, they were 0.286 killed and 1.275 injured.

February makes a fair showing for a winter month, except in the number of persons injured. Both the month and the year compare very favorably with the previous years.

Chicago through rail shipments eastward, by the incomplete report, including only flour, grain and provisions, and this year excluding all shipments by the Chicago & Atlantic, were 25,915 tons this year, against 75,974 last year. The Chicago & Atlantic shipments were probably not more than two or three thousand tons. For five years previous the shipments of all freight, by the complete report, had been, in the corresponding weeks, in tons:

	1880.	1881.	1882.	1883.	1884.
75,439	55,486	38,646	69,368	55,947	

Allowing for all the higher-class freight, as well as for the Chicago & Atlantic, the shipments last week may have amounted to 41,000 to 46,000 tons, and at most were very much less than in any previous year except 1882. Rates were down to 15 cents per 100 lbs. at this time last year, but not till a week later in 1884.

For seven successive weeks the total Chicago shipments and the percentage taken by each railroad have been:

Tons:	Week ending—					
	Feb. 6.	Feb. 13.	Feb. 20.	Feb. 27.	Mar. 6.	Mar. 13.
Flour.....	5,564	4,368	6,247	4,972	3,968	5,684
Grain.....	17,888	22,789	34,831	30,000	34,023	19,086
Provisions....	9,738	9,348	7,048	5,392	7,225	7,262
Total.....	33,170	36,503	48,146	40,364	45,214	32,037
Per cent.:						
C. & Grand T.	8.5	13.1	22.7	21.9	22.2	19.6
Mich. Cen.....	12.1	11.4	11.7	21.2	27.8	18.0
Lake Shore.....	13.2	11.4	8.4	9.4	17.6	28.1
Nickel Plate.....	11.1	16.7	15.6	16.9	2.7	4.1
Ft. Wayne.....	18.9	18.1	16.4	10.5	10.6	11.7
C. St. L. & P.....	13.2	13.1	15.1	9.7	6.1	9.5
Balt. & Ohio.....	11.3	6.4	4.4	4.0	8.3	13.0
Ch. & Atlantic.....	11.7	9.7	5.7	6.4	4.7
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

Omitting the Chicago & Atlantic, the total shipments for eight weeks have been:

	Jan. 30.	Feb. 6.	Feb. 13.	Feb. 20.	Feb. 27.	Mar. 6.	Mar. 13.	Mar. 20.
22,921	29,416	32,941	45,424	37,796	43,076	32,637	25,915	

Thus the seven roads now reporting carried less last week than in any other since January, and nearly 40 per cent. less than in the first week of March and 20 per cent. less than in the second week. Substantially the whole of the decrease in the last two weeks has been in grain, which is perhaps held back by the near approach of the opening of navigation, which is expected to be early this year. It is doubtful, however, whether a reduction from 25 to 20 cents would make much difference in shipments. Probably at a 15-cent rate the movement would be very much larger, but then there would be no profit in it. The very light business now is more profitable than the very heavy business carried at this season last year and the year before.

The exports of pork products in February were about the same as in January and decidedly small; they were, however, a little more than last year, while the January shipments were 36 per cent. less. For ten years they have been in February, in millions of pounds:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
54.6	138.6	129.5	100.4	140.0	72.2	68.2	45.3	64.4	69.0

The exports this year compare well with those of the three (bad) years previous, but they are less than in any of the five years from 1878 to 1882, and only half as great as in 1878 and 1881.

In other provision exports in February, there is a decrease of 36 per cent. in live cattle, 21½ in fresh beef, 14 per cent. in butter and 11½ in cheese, and the aggregate value of the entire beef, pork and dairy products (not including live animals) was in January, February and the two months then ending:

Year.	January.	February.	Two months.
1882.....	\$13,200,379	\$9,216,582	\$22,416,961
1883.....	10,978,825	9,792,040	20,770,865
1884.....	9,091,877	6,960,475	16,052,352
1885.....	11,965,978	7,435,499	19,401,477
1886.....	6,668,814	6,661,318	13,330,132

Thus the decrease from last year is less in January than in February, because the exports were large in January last year and not in February, and not because there was any improvement over January in February this year, the latter being slightly the smaller, and less than in any previous February here given. Compared with last year the decrease in February is 10½ per cent. and in the two months 31½ per cent., and since 1882 the decrease for the two months is 40½ per cent.

The cotton exports last February were 29 per cent. more in quantity and 19½ per cent. more in value than the corresponding month of last year, the average value per pound having fallen from 10.78 to 9.99 cents. The value of the cotton exports was nearly equal to that of grain and provisions together last February, and the aggregate values of the cotton, grain, provision and petroleum exports have been for February and the eight months, for three years:

	1883-84.	1884-85.	1885-86.
February.....	\$44,226,497	\$37,555,053	\$37,229,778
Eight months.....	378,047,740	394,053,485	313,223,947

The gain in cotton just about balanced the loss in bread, stuffs and provisions in February, and the aggregate value was nearly the same this year as last, but it was \$7,000,000 (15½ per cent.) less than in 1884. For the seven months the

export value of cotton this year were 18½ per cent. less than last year and 17 per cent. less than in 1883-84.

The anthracite coal companies, which have been so far this year running without any attempt at combination, have at last reached an agreement. During the first quarter of the year the lack of an agreement has resulted in a very large increase of production over last year and a general demoralization of prices, large quantities of coal having been sold at figures which are probably below the actual cost of mining and transporting it. The preliminary agreement now made puts the production for the year at 33,500,000 tons, this figure to be modified hereafter should the condition of the market seem to make it necessary. The details—including the important one of the allotment to be made to each company—are still to be settled, but the experience of the last three months has apparently so impressed the managers that there will probably be less than the usual difficulty in making a final settlement on a fair basis.

The list of state railroad commissioners given on another page shows that there are such officers now in 26 of the 38 states, not including the commissions for assessing railroads for taxes which exist in Arkansas, Indiana and New Jersey, which have not the duties usually understood as belonging to railroad commissions. The states without commissions include several in the part of the country where the railroad system is most developed and traffic densest, as New Jersey, Pennsylvania, Delaware and Maryland in the East, and Indiana in the West. With these exceptions there is a commission in every Northern state on the Atlantic slope, from New England to Colorado. They are comparatively new in the South, yet there every state east of the Mississippi has one now, except North Carolina and Florida, though the Tennessee Commission, elected by popular vote to hold office till next fall, has been left with nothing to do by the repeal of the law last winter. The newer commissions are those of West Virginia, Mississippi, Nebraska and Colorado. Pennsylvania requires annual reports from the railroads, as New York did before it had a commission, but all or nearly all Pennsylvania companies make full reports to their shareholders, and the state reports are scarcely ever used. Light in dark places would be thrown by exacting reports in Maryland and Texas, where the company reports are often defective in important particulars, or are irregularly made, or, in Texas, even not made at all.

The resignation of Mr. Charles Latimer, who has for the past twelve years been Chief Engineer of the New York, Pennsylvania & Ohio Railroad, and for several years previously Principal Assistant Engineer, ends what has been in many ways a remarkable and useful career on that road. The organization of the "Engineering Department" of that road was peculiar in resting complete control of the track and construction department, including purchases therefor, in the Chief Engineer, who reported only to the President or (when there was one) General Manager. With this unusually large discretion, and with the track in very bad and even dangerous condition, Mr. Latimer took the road and within a few years, without more than usual maintenance expenses, brought it up to a condition which is well known by track men to have been unusually fine for a road on which only moderate expenditures were made. A sufficiently strong evidence of this is the striking fact that in the whole of the long period mentioned, not a single passenger was killed or seriously injured on the line by accidents due to defects of track.

What has more particularly excited interest in Mr. Latimer's work, however, is not the result, but the way in which the result was reached. A man of strong human sympathies and himself an enthusiast in his work, he early established between his assistants and himself the relation of friend and fellow-laborers rather than of master and servant. "Roadmasters' meetings" were established on this road among the first, and an annual pamphlet published containing a report of the discussions, which went to every section foreman on the line, and by comparisons of results accomplished and otherwise the interest of the men in their work was quickened, and a friendly rivalry and *esprit du corps* maintained.

His success in this direction is commended to the attention of all railroad officers, whether they approve of Mr. Latimer's organization of the department or not—an organization which was radically changed after Mr. King succeeded to the presidency of the Erie. That success was very largely due to a hearty human sympathy with every man under him, which, unfortunately is far too uncommon in railroad officers and others in charge of large bodies of men, but which is indispensable to secure interest and true faithfulness in the performance of work, hardly to be expected when men are regarded as mere cogs in a machine. There would be fewer strikes, we may be sure, if every railroad officer could carry with him on his retirement, as Mr. Latimer does, the respect and affection of every worthy man who has served under him.

In the Massachusetts Legislature, the Committee on Railroads has reported a bill to confirm a lease of the Worcester, Nashua & Rochester road to the Boston & Maine Railroad. This lease has been stoutly opposed before the Committee by the Boston & Lowell, on the ground that it trespassed upon territory which fairly belonged to that company, and by some Eastern Railroad stockholders as prejudicial to their interests. It was also opposed by a distinguished member of the Boston bar on grounds of public policy, it being urged that the directors who carried through the scheme had violated the law in making a stock dividend, and had thereby

forfeited the charter of the road, and subjected themselves to heavy penalties. The opposition, however, was ineffectual. There were strong reasons for confirming the lease, and the Committee did not pass upon the question of illegal action of the directors in another matter, which could more properly be left to the courts.

The control of the Worcester, Nashua & Rochester road is of more importance to the Boston & Maine than to the Boston & Lowell or any other company. The Boston & Maine is in possession of the Portland & Rochester road, and by this lease secures a line between Portland and Worcester and a somewhat shorter route to New York. If the Worcester & Rochester road were in the control of a rival of the Boston & Maine, there might be danger of a new road to the state line of Maine, and under the laws of that state a competing line might be secured to Portland.

As an offset to this lease the Boston & Lowell has had before the same committee a petition for a charter for a new line between Salem and Boston, and its managers have apparently hoped that if the lease should be confirmed the charter would be granted. But it is understood that the provisions of the general law with regard to special charters, as well as certain rules of the Legislature, offer obstructions to this project which cannot be removed at the present session. The Boston & Lowell, therefore, seems to be the loser in this part of its contest with the Boston & Maine. What the next move will be does not yet appear.

The recent accident (March 2) on the New York, Ontario & Western road at Fish's Eddy, which was reported in the dispatches at the time as due to the failure of a bridge, was not properly attributable to that cause. A part of the freight train which was wrecked was derailed, just before reaching the bridge, by a broken rail, and the cars running along on the ties struck the end of the bridge truss and threw it down, so that the wreck and the loss of the lives of the four trainmen who were killed was due to the failure of the rail and not of the bridge. Since February, 1884, over two years, there has been no accident in the state of New York due to a broken bridge—a record which is probably due, in part at least, to the careful inspection of bridges under the direction of the Railroad Commission.

An English firm of locomotive builders, Peckett & Sons, of Bristol, have made rather a new departure in locomotive building. They intend in future to keep from thirty to forty locomotives of different types and sizes always in stock, so that a customer can obtain an engine without delay. They have commenced building new shops for storing locomotive engines when completed, and are building new store-rooms for finished duplicate parts, so that any part can be sent off at a moment's notice, their engines all being made to standard gauges and templates.

A New England locomotive builder lately informed us that he found it a good plan to always have at least one completely-finished engine in stock. It enabled many buyers, who were not well versed in locomotive lore, to appreciate better the good workmanship and convenience of the engines built by the firm; and it often resulted in the engine being sold, with immediate delivery, to a small line for construction, while a sister engine was being built from the standard patterns and templates to assist the first engine when the line was opened for traffic.

The average earnings per train-mile of British railroads have fallen every year but one since 1874, having been \$1.36 in 1874, \$1.26 in 1879, and \$1.19 in 1884. But the decrease in working expenses has been almost as regular, and until 1881 just as great, so that the net earnings per train were marvellously uniform, varying only between 60.24 and 61.36 cents per train-mile from 1874 to 1880. Since 1880, however, the decrease in expenses has not kept pace with that in earnings, and the net earnings have fallen off steadily. For seven years the earnings and expenses have been, in cents per train-mile:

	1877.	1879.	1880.	1881.	1882.	1883.	1884.
Receipts.....	130.50	126.24	125.42	123.48	123.80	121.76	119.12
Cost.....	69.38	66.00	64.74	64.56	64.94	64.34	63.18

Profit.....	61.12	60.24	60.68	58.92	58.86	57.42	55.94
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The results are very much more uniform than would be shown in this country, even in those parts of it where rates are steady. The larger part of the reduction in expenses of the British railroads has been in the cost of maintenance of road. This has fallen from 15.70 cents per train mile in 1874 to 12.76 in 1879 and 11.64 cents in 1884. The decrease since 1874 has been 12.58 cents in the total expenses and 4.06 in maintenance; since 1879 it has been 2.82 cents in the total and 1.12 in maintenance. Meanwhile train expenses have decreased from 21.62 cents in 1874 to 16.38 in 1879 and 16.70 in 1884. *Per mile of road* there has been much less change. For the five years from 1874 to 1878 inclusive, they ranged from \$1,865 to \$2,020, for maintenance of road, and averaged \$1,965. Then they fell off suddenly to \$1,690, and have never been so low since, ranging thence to \$1,800 in 1883 and \$1,750 in 1884, and averaging \$1,751 from 1879 to 1884—nearly 11 per cent. less than the average for the five years previous.

The total expenses per mile of road have been comparatively uniform, ranging from \$9,665 in 1875, and \$9,625 in 1883, to \$8,775 in 1879, and the gross earnings have also shown less changes than might have been expected, averaging \$17,690 for the five years from 1874 to 1878, in which they never fell below \$17,295, nor rose above \$17,755. In 1879 they fell suddenly to \$16,780, but they recovered immediately to \$17,555 in 1880, and for the five years ending with 1884 averaged \$17,905, reaching the maximum, \$18,255, in

1883. In this country the average earnings per mile were \$7,461 in 1883, and \$6,663 in 1884.

The manufacturers in Berkshire County, Mass., are not yet satisfied with the rates they obtain for the transportation of coal. The West Shore road and its connections, by extremely low rates, have carried coal from the Clearfield mines to North Adams, much to the advantage of the people of that region over those of the central part of the county. The rate from North Adams to Pittsfield, on the branch of the Boston & Albany road, is one dollar per ton, by the car load, and some of the manufacturers of the last-named place, desiring to procure this coal, asked the Boston & Albany to reduce the rate to 65 cents, on the ground that that was the rate fixed by the Railroad Commissioners for similar service on the Housatonic Railroad. The management of the Boston & Albany declined to make so large a reduction, but offered to put the rate at 90 cents. The manufacturers then went to the Railroad Commissioners, asking the board to recommend the reduction which they desired, and the parties having been duly heard, the board has rendered a decision declining to make such a recommendation, on the ground that the rate offered by the Boston & Albany is not unreasonable, and is not high as compared with rates for a like distance on other roads in the state. It appears also that the petitioners were in error in regard to the rate referred to on the Housatonic road, being misled by an error in the order as printed in the newspapers. That rate is 75 cents, instead of 65, and it was fixed by the board to meet the rate voluntarily established by the Housatonic from Bridgeport to the same point, and it was, therefore, not a fair standard for similar service on other roads, and under different circumstances.

Whether the low rates at which coal has been delivered in North Adams will long continue is quite doubtful, and the probability is that the Pittsfield manufacturers will not long find it an object to go there for their coal.

The railroad man who has his eyes about him can hardly fail to note, as he passes quickly through the yard of the Grand Central Station in New York, its admirable condition, which is certainly not surpassed in America, although the yard is so small that there would be little excuse were it otherwise. The great signal towers from which every switch and crossing in the yard is operated, and the cast-iron substitutes for cross-ties (which with the Brush interlocking bolts are now used on all the more important tracks in the yard) are almost sure to catch the eye of a railroad man, and except for these details the inconvenience and danger of having all incoming and outgoing trains cross each other as they do, directly in front of the station, would probably be far more seriously felt.

The most striking feature of the yard as respects novelty is the fine example of the use of "double slip points" (illustrated in the *Railroad Gazette* of March 13, 1885), by which the crossing of tracks is effected, the incoming track being carried across seven distinct tracks by means of them, in a dead straight line, but with "points" connecting with each so as to furnish a cross-over track between any two of them wherever desired, as it frequently is. This is no longer the only example of the use of such switches in America, there being another fine example at Philadelphia, in the Pennsylvania yards, and numerous other smaller ones, but it still remains one of the best, as it was one of the earliest examples of American use of this English device, whose excellence is beyond question, and whose cost is not so great that it should not be used much more extensively than it is.

Record of New Railroad Construction.

Information of the laying of track on new railroad line is given in the current number of the *Railroad Gazette* as follows:

Carolina Central.—Extended from Shelby, N. C., west to First Broad River, 2 miles.

Chicago, Burlington & Northern.—Track laid from La Crosse, Wis., north 10 miles; also north of Savanna, Ill., 10 miles.

Marquette, Houghton & Ontonagon.—Extended across Portage Lake to Hancock, Mich., 1 mile.

Wisconsin Central.—Track laid from the line of Cook County, Ill., north 24 miles.

This is a total of 47 miles on 4 lines, making in all 295 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

Miles.	Miles.	Miles.
1886.....295	1881.....541	1876.....304
1885.....165	1880.....975	1875.....129
1884.....324	1879.....298	1874.....198
1883.....521	1878.....328	1873.....429
1882.....1,181	1877.....165	1872.....642

These figures include main track only, second tracks and sidings not being counted.

NEW PUBLICATIONS.

Tables for Calculating the Cubic Contents of Excavations and Embankments, by an Improved Method of Diagonals and Side Triangles. By John R. Hudson, C. E. Revised Edition. John Wiley & Sons, New York.

As was stated in our notice of the first edition of this work (*Railroad Gazette*, March 23, 1884), "this method adopts the same device for dividing the surface of the ground into triangles as is familiar to most engineers, from its appearing in Henck's book. We cannot recommend the method itself, seeing no possible gain from it either in accuracy or convenience."

The tables of this volume, however, it is singular to observe, are equally well adapted to computation by end-areas, which is amply accurate for a large proportion of earthwork solids, and in fact they really constitute a very simple method for computing earthwork by that method. With a simple table

of corrections by the prismoidal formula for solids differing much in centre-height, based on the assumption that for the purpose of determining a correction for the end-area solidities the actual centre-heights may simply be subtracted from each other as if the sections were level sections, no better method need be desired, if one wishes to use tables at all.

No inkling of this is to be found in the book, however, but instead, we have the work just doubled by the cumbersome system of dividing the ground into triangular planes by diagonals which began and ended with Henck's "Field-Book." The articles on the use of the prismoidal formula and (in less degree) on irregular cross-sections show a lack of that grasp of the theory of the subject which enables one to perceive and define the best way as well as a way of treating them, which makes them of little practical utility, and which will prevent their being much used.

The tables, however, are quite voluminous, being for thirteen different road-beds, and, as we said, may be used by those who like tables in a very useful way. It gives one a shock of doubt as to their accuracy to find the first ten numbers of the volume (on first page of preface) wrongly given (12 for 6), but such errors often creep into such places, as prefaces or headlines of tables when they have been carefully excluded where they are most important. If the author will add a table of prismoidal corrections and explanation of how to use them and of the method of end-areas, and define how, when and where it is and is not in error, and will strike out considerable parts of what he does give, then, and not till then, he will make his tables safe and useful implements in the hands of inexperienced men.

Railroad Commissioners of the Various States.

The following is a list, complete to March 1, of the various state railroad commissions:

Alabama.—Henry R. Shorter, Chairman, Montgomery; Wiley C. Tunstall, Levi W. Lawler.

California.—G. J. Carpenter, Chairman, Sacramento; W. P. Humphreys, W. W. Foote.

Colorado.—W. B. Felker, Denver.

Connecticut.—Geo. M. Woodruff, Chairman, Hartford; John W. Bacon, Wm. H. Hayward.

Georgia.—Campbell Wallace, Chairman, Atlanta, Ga.; L. N. Trautwell, A. C. Erwin.

Illinois.—J. I. Rinaker, Chairman, Carlinville; Wm. T. Johnson, Chicago; B. F. Marsh, Warsaw. Office at Springfield.

Iowa.—Peter A. Dey, Chairman, Des Moines; J. W. McDill, L. S. Coffin; E. G. Morgan, Secretary.

Kansas.—L. L. Turner, Chairman, Topeka; Almerin Gillette, Jas. Humphrey.

Kentucky.—J. P. Thompson, Chairman, Frankfort; A. R. Boone, Jno. D. Young.

Maine.—Asa W. Wildes, Chairman, Skowhegan; Jno. F. Anderson, Portland; David N. Mortland, Rockland.

Massachusetts.—Thomas Russell, Chairman, Boston; Edward W. Kinsley, Everett; A. Stevens; Wm. A. Crafts, Clerk.

Michigan.—Hon. Wm. McPherson, Commissioner, Lansing; Maj. Wyllis C. Ransom, Deputy Commissioner.

Minnesota.—J. H. Baker, Chairman, St. Paul; S. S. Murdock, Geo. L. Becker; E. S. Warner, Secretary of Board.

Mississippi.—J. M. Stone, Chairman, Jackson; W. B. Augustus, Wm. McWillie.

Missouri.—Geo. C. Pratt, Chairman, Jefferson City; Jas. Harding, Wm. G. Downing.

Nebraska.—Attorney General Wm. Leese, Chairman, Lincoln, Neb.; Secretary of State E. P. Roggen, Auditor H. A. Babcock (C. F. Busbow, Chas. H. Gere, B. R. Cowdery, secretaries. These secretaries, one for each Congressional district, are the active officers).

New Hampshire.—Hon. O. C. Moore, Chairman, Nashua; E. B. Sanborn, Franklin; E. J. Tenney, Claremont.

New York.—John D. Kernan, Chairman, Albany; Wm. E. Rogers, John O'Donnell; Wm. C. Hudson, Secretary.

Ohio.—Henry Athrop, Columbus.

Rhode Island.—Walter R. Stiness, Providence.

South Carolina.—M. L. Bonham, Chairman, Columbia; D. P. Duncan, E. P. Jervy; M. T. Bartlett, Clerk.

Tennessee.—The Railroad Commission law has been repealed since election of the following, whose term of office expires Dec. 31, 1886: A. M. Hughes, Chairman, Nashville; W. W. Murray, M. J. Condon.

Vermont.—Thos. O. Seaver, Woodstock.

Virginia.—H. G. Moffatt, Jr., Richmond.

West Virginia.—The Governor, Auditor, Treasurer, Attorney-General and Superintendent of Free Schools assess railroad property, Charleston, W. Va.

Wisconsin.—N. P. Haugen, Madison.

In several states officers for the assessing railroad property for taxation are called "commissioners," and these usually, but not in all cases, hold other leading State offices. Thus:

Arkansas.—The Governor (Simon F. Hughes), Auditor (A. W. Fales), and Secretary of State (E. B. Moore).

Indiana.—The Governor (Isaac P. Gray), Lieutenant-Governor (Gen. M. D. Mansson), Secretary of State (Wm. R. Myers), Auditor (James H. Rice), and Treasurer (John J. Cooper).

New Jersey.—E. J. Anderson, Chairman; John J. Toffey, Robert A. Sheppard, Trenton. Exclusively to assess taxes.

Pennsylvania.—The railroads must make annual reports to the Auditor of State, but there is nothing like a railroad commission.

The following have no railroad commission: Delaware, Florida, Louisiana, Maryland, Nevada, North Carolina, Oregon, Texas. Texas has a State Engineer, whose duty is to inspect the condition of railroads.

TECHNICAL.

Locomotive Building.

The New York Central & Hudson River shops at East Buffalo, N. Y., have just completed a new passenger locomotive for the road; it has 17 by 20 in. cylinders and 66 in. driving wheels.

The Rhode Island Locomotive Works in Providence are building 5 consolidation engines with 20 by 24 in. cylinders and 56 in. drivers for the Fitchburg Railroad.

The Taunton Locomotive Works in Taunton, Mass., are building two locomotives with 18 by 26 in. cylinders for the Old Colony road.

The Baldwin Locomotive Works in Philadelphia have an order for 10 locomotives of standard gauge for the South Carolina Railway.

The Mason Machine Works in Taunton, Mass., are building 2 locomotives for the Old Colony Railroad.

The Boston & Lowell shops in Concord, N. H., are building 4 new locomotives for the road.

The Car Shops.

The Pullman Car Shops at Pullman, Ill., have recently completed several new Wagner sleeping cars, which have been put on the New York Central road.

The Harlan & Hollingsworth Co. in Wilmington, Del., is building 250 freight cars for a railroad in the Argentine Republic.

The New York Central shops at East Buffalo, N. Y., are building a number of new freight cars for the road. These are the first new cars built at those shops.

Bridge Notes.

The Phoenixville Bridge Co. at Phoenixville, Pa., has taken a contract to build a bridge over the Tallapoosa River, in Alabama, for the Columbus & Western road.

The Passaic Rolling Mill Co. in Paterson, N. J., has taken the contract for a new iron bridge over the Passaic River at Dundee Lake for the New York, Susquehanna & Western road.

Messrs. Coolidge & Co., of Chicago, have just completed a new bridge over Portage Lake at Hancock, Mich., connecting the Marquette, Houghton & Ontonagon and the Mineral Range railroads.

Iron and Steel.

The New Albany Steam Forge Co., is preparing to start up its works in New Albany, Ind., shortly.

Carnegie, Phipps & Co. are building a new mill 160 by 240 ft., adjoining their Bessemer steel works at Homestead, near Pittsburgh. This mill will contain machinery for rolling armor plates for ships and other heavy steel plates, and an open-hearth steel plant.

The Allentown Iron Co. has put another furnace at Allentown, Pa., in blast.

The E. & G. Brooke Iron Co. has put its No. 3 furnace at Birdsboro, Pa., in blast.

The Stewart Iron Co. at Sharon, Pa., has both of its furnaces now in blast.

The new furnace at Hanging Rock, O., has gone into blast. It was built two years ago, but has never been started up until now.

The New Albany Rolling Mill Co. in New Albany, Ind., is replacing its iron rail plant with machinery for rolling bar and plate iron.

The Youngstown Steel Works at Youngstown, O., are being put in order to start up, after a stoppage of nearly three years.

A number of Pittsburgh capitalists have formed a company for the erection of steel works at Germantown, near that city, on the Pittsburgh, Virginia & Charleston Railroad. The plant will have two 5-ton Bessemer converters of the most modern pattern, and operations will be begun by Jan. 1, 1887, giving employment to 250 men. The company has purchased 50 acres of land at Germantown.

Manufacturing and Business.

The Westinghouse Air Brake Co., in Pittsburgh, has begun to run its works full time, after running short time for 18 months. This change is made on account of a general improvement in business, and not to fill any special orders.

The Providence Steam Engine Co., in Providence, R. I., is building one of its improved Greene engines of 700 H. P. to go to Brooklyn, N. Y.; one of 150 H. P. for Paterson, N. J., and one of 150 H. P. to go to Philadelphia.

The Fitchburg Steam Engine Co., in Fitchburg, Mass., is running its works full time. Orders lately received include an engine of 250 H. P. for a mill in Brockton, Mass., and a number of smaller engines.

The Rail Market.

Steel Rails.—The market is firm, with quotations \$34.50 @ \$35 per ton at Eastern mills. There is no disposition to shade prices, and it is now not easy to place orders for spring or early summer delivery, nearly all the mills being full.

Rail Fastenings.—Quotations are steady at 2.40 cents per pound for spikes in Pittsburgh; 2.75 @ 3.10 for track-bolts and 1.70 @ 1.75 for splice-bars. An increasing demand and a firm market are reported.

Old Rails.—The market for old iron rails is weak and unsettled, with few sales reported. Quotations are nominal at \$21.50 @ \$22.50 per ton at tidewater. Small sales of old steel rails are reported in Pittsburgh at \$22 @ \$24 per ton.

British Rail Exports.

The total exports of rail from Great Britain were nearly the same in February this year as last (30,596 tons, against 30,778), and of this 1,000 tons went to the United States this year, against 20 last year. India took nearly 40 per cent. of the whole February exports this year, Australia 24½, Brazil 13.8, and Canada 8.2 per cent. of the total British exports.

American and English Bridge Builders.

We clip the following from an exchange rescued from a watery grave in the Oregon:

"The intelligence recently received that the Union Bridge Co. of New York are the successful tenderers for a new bridge over the Hawkesbury, New South Wales, is not comforting to the average British mind. As a matter of fact, it is another of the disquieting items of news, latterly so frequent, which seem to indicate either that British manufacturers are sadly wanting in enterprise, or that they are behind their modern competitors in respect of skill and adaptability. The structure over the Hawkesbury will be a double-track railway bridge, of a total length of 3,000 ft., in seven spans of 415 ft. each, resting upon stone piers. Of the 16 plans and tenders submitted, the Union Bridge Co's was adjudged the best, not only because the price, £300,000, was much below the original estimates of the government engineer, but also because the foundations proposed were superior to the others. These foundations will be of beton, inclosed in iron caissons, and will be carried to 170 ft. below tide-water. Taking the work as a whole, the contract price seems exceedingly low, even though it is borne in mind that Americans have had abundant home practice in bridge-building. In any case it would be interesting to learn how our principal bridge-builders account for the circumstance that on neutral ground—and that neutral ground a British colony—they have been beaten by the American company mentioned. If they were defeated on their merits—which we are inclined to doubt—would it not be advisable for a member of each firm to live on the banks of the Hawkesbury during the erection of the bridge so as to pick up for future service such "wrinkles" as the Americans have to spare?"

A Rubber Packing Patent Decision.

The long delayed suit of the New York Belting & Packing Co. vs. Allan Magowan for an infringement of their vulcanized rubber bag packing has been recently decided in favor of the company. In his decision, after some pertinent compliments to the ingenuity of the inventors, Judge Dixon declared that "after carefully comparing it with the exhibits which are put in to show anticipation and its lack of patentability, I am of the opinion that the patent reveals invention; not so much so because the packing is more elastic by reason of the addition of pure rubber, but because the patent discloses a new and better method of obtaining a tight joint between the padding and the

piston rod than has been obtained by any other combination of elements, new or old. It is a fact not to be overlooked, and has much weight, that the products manufactured under it went at once into such extensive public use as to almost supersede all packing made under other methods. Such a fact is pregnant evidence of its novelty, value and usefulness, and accounts for the defendants' infringement.

Fast Time.

The Lincoln (Neb.) *State Journal* says that last week a special train on the Chicago, Burlington & Quincy road, having several officers of the company on board, made the run from Denver to Akron, 254 miles, in 5 hours and 10 minutes. The number of stops is not given, but the extraordinary speed of 50 miles an hour was maintained for this long run. Mr. Thomas J. Tucker was engineer on the locomotive.

Nut-locks.

On the new bridge over the Ohio River at Louisville, Ky., now under construction by the Kentucky & Indiana Bridge Co., the Van Dusen nut-locks, made by the Peerless Manufacturing Co., of Louisville, are being used on the bridge, approaches and track. Chief Engineer John McLeod has adopted this nut-lock, giving his opinion that it is the best for the purpose.

Fast Work with a Pile-Driver.

On Tuesday last Mr. J. F. Hanscomb, contractor on the Wisconsin River bottoms for the Chicago, Burlington & Northern Railroad, performed a great feat of pile driving. In nine hours, with one of his lightning pile drivers, he drove down 100 oak piles, that measured 16 in. at the butt ends, and were 23 to 25 ft. long, penetrating an average of 20 ft. The average strike of the hammer was 40 blows to the pile, and the distance from starting point was 400 ft. over the bottom land.

Massachusetts Civil Engineers' Association.

A meeting of the Massachusetts Civil Engineers' Association was held in Young's Hotel, Boston, March 19, about 75 gentlemen being present. The business meeting was devoted to the reading and acceptance of the reports of the Treasurer and other officers of the Association. An election was then held, which resulted as follows: President, George L. Vose; Vice-President, L. Fred. Rice; Secretary, Horace L. Eaton; Treasurer, Henry Mauley; Librarian, Henry D. Woods; Auditor, Fred. P. Stearns.

Papers on the Beacon Street Reservoir and the Lowell Water-Works and the Accident which Occurred There in 1885 were read by Mr. George C. Evans, City Engineer of Lowell. Speeches were made by Prof. William T. Sedgwick, of the Institute of Technology; Prof. Edward S. Morse, Director of the Peabody Academy of Sciences; James T. Furber, General Manager of the Boston & Maine Railroad; James E. Howard, in charge of the testing machine at the Watertown Arsenal, and others.

Iowa Society of Civil Engineers.

The second meeting of the Iowa Society of Civil Engineers was held in Cedar Rapids March 17. The meeting was well attended by representative members of the profession from different parts of the state.

An interesting and instructive programme of exercises had been arranged, including a paper by C. W. Irish, of Iowa City, on Magnetism and Magnetic Variation in Iowa.

The general discussion brought out many important matters of interest, and instruction as well, to the members present.

The success of the new society is now assured, and it will receive its charter from the Secretary of State at the next meeting. There are 21 active members.

Papers will be read at the next meeting by Messrs. Macdonald, Brown, Swanitz, Hess, Ischinger, Davis and Mitchell, and the general discussion will be led by Mr. Steyh, of Burlington.

The society adjourned to meet in Cedar Rapids, in July, at call of President and Secretary.

A Left-Handed Yard Engine.

There is now being constructed in the locomotive shops a "left-handed" switch engine. This may seem a trifle strange to most people, yet such is the case. It is made after the style of the five new switch engines recently made here, but instead of the engineer sitting in his usual place on the right hand side of the cab, the situation will be reversed and he will occupy the left hand or fireman's side. The engine is for use in the upper end of the Aurora yard, where the tracks curve so that the signals are obliged to be given on the left-hand side of the engine. As it is now with an ordinary engine, the fireman is obliged to receive the switchman's signals and transmit them to the engineer, thus making delay and liability to accident. With the new engine the engineer can take the signals himself and thus be responsible for a correct understanding of them.—*Aurora (Ill.) Beacon*.

Krupp Car Wheels in New England.

A new and improved style of car wheels have made their appearance, combining the qualities of safety and low price. They are made at the works of Fried Krupp, Essen, Germany.

The tire is forged steel, with a wrought-iron coil disc centre; the two parts being welded together form a perfect indestructible wheel in one piece. About 60,000 are now in use in Europe. The first of them seen in America were reported recently for the Boston & Providence Railroad Co. whose second order is now being filled. The New York, Providence & Boston Railroad Co. has also placed a trial order.—*Boston Journal*.

THE SCRAP HEAP.

A Remarkable Accident.

On the evening of Feb. 27, as the milk train on the Housatonic Railroad was approaching the crossing of the New York & New England road at Hawleyville, Conn., it was derailed by a misplaced switch and separated into three parts. The locomotive and tender broke loose and ran over the crossing, then turned toward the left and brought up against a telegraph pole, which stopped their further progress with considerable damage. The first four cars, which were coupled with the old link and pin coupler, broke loose and turned up on the New England road-bed, running along by the track some distance, when they stopped, also with some damage. The remaining seven cars, which were coupled with the Hien coupler, held together and ran on the ties nearly up to the crossing, when they also stopped. These cars were not damaged, and when the wrecking train arrived they were quickly hauled back on the track by the use of a portable frog and were sent forward on their journey to Bridgeport and New York, where they arrived safely and in good order, not a drop of the milk having been spilt. In this case the holding of the couplers did good service, keeping the cars in line, holding them on the road-bed and preserving them and their contents from damage.

Aged Considerably.

As the car reached Westville, an old man with a long white beard rose feebly from a corner seat and tottered

toward the door. He was, however, stopped by the conductor, who said, "Your fare, please?" "I paid my fare." "When? I don't remember it." "Why, I paid you when I got on the car." "Where did you get on?" "At Fair Haven." "That won't do," said the conductor; "when I left Fair Haven there was only a little boy on the car." "Yes," answered the old man, "I know it. I was that little boy."—*New Haven Morning News*.

Attempt at Train Wrecking.

An attempt was made Thursday afternoon to wreck the train on the Housatonic Railroad which reaches Bridgeport about half-past 5. On a high embankment a mile north of Trumbull Church and near a short curve, a tie was fastened across the track. The train ran into it, but sustained no damage beyond the breaking of the pilot. No one was hurt, and some of the passengers were unaware that there had been any such accident until they asked why the train had stopped. When the train reached Bridgeport officers were sent up to investigate. They found some men who had been hunting muskrats in the vicinity, who said they had seen two young men running down the track just before the train came along. Inquiries were made of other parties, and Officer Arnold secured a good clue to the identity of the would-be wreckers and subsequently arrested Hiram Kelly and George Taylor, of North Bridgeport. After being locked up Taylor confessed and very naturally put the blame on Kelly, and claimed that all he did was to look on while the latter did the work.—*Hartford (Conn.) Courant*, March 20.

Unrequited Affection.

For some time, says the Columbia (W. T.) *Chronicle*, the trainmen on the Pomeroy Branch have been in the habit of throwing kisses and otherwise deporting themselves in a manner not recognized as strictly proper whenever they passed a farmhouse containing a pretty girl. One day last week one of the boys sighted a feminine form, and began at once to converse with her in sign language. The lass was expecting him, and when he began his foolishness a six-shooter was drawn from beneath her apron, and she began planting 38-calibre bullets in close proximity to the railroad man's head. Some lively dodging ensued as the throttle of the engine was pulled wide open, but he failed to get out of range before the revolver was emptied. No blood was drawn, however. The railroadier afterward said he did not blame the girl for shooting at him, "but she was too good a marksman to fool with."

River Rafting.

A New England railroad man tells a good story about a R (iver) R (afting) & Steamboat Company. The President, Treasurer, Secretary, Head Cook and Bottle-Washer of one of these concerns went off (all alone) on a trip through the South. He was received with true Southern hospitality, and passed, dinners, and whisky that had paid no toll were alike showered upon him. All this was exceedingly pleasant, but soon after he reached the banks of his native canal where his small tug was tied up at night in solitary grandeur, he was startled to receive a letter from one of his former hosts. A Southern railroad man was going to invade the North and claim the courtesies of the R. R. & Steamboat Co. The tug was swept and garnished in a hurry, a plentiful repast of lacon, champagne, and beans was provided; and the guest was treated to a sail up the canal and back again. The President escorted his guest back to Boston, and as they entered the splendid Boston & Lowell passenger depot, the guest, who was full of good feeling and beans exclaimed, "I don't—hic—think much of your road—hic—but your terminal facilities are d—d fine!"

Train Robbers in Mexico.

The Mexican *Financier* of March 13 says: "That an attempt should be made by a party of robbers to waylay and capture a freight train in the midst of a very thinly settled country is not of sufficient importance to make it the theme of exaggerated telegraphic dispatches. The affair at San Francisco station, state of Guanajuato, the other day, was, we believe, the second attempt within two years, which is not at all a bad exhibit for a great trunk line running over 1,200 miles. When we recur to more recent attempts on railway trains in the heart of great and populous states in the neighboring Republic we find that American railway highwaymen have displayed more wanton recklessness of human life than can be charged to the infrequent bands of Mexican *caballeros de industria*. Mexican banditti have not reached that state of cruel indifference to human life that they set fire to lofty bridges, hoping to precipitate crowded passenger expresses into horrible abysses. Our highwaymen are comparatively gentle creatures. But they are bad enough, and the determination of the Executive and of the acting Governor of Guanajuato to make an example of the latest raiders will be applauded on all hands. When the railways were first opened here, it was difficult for the mass of the people to regard them as having anything to do with the transportation of Mexican passengers and freight, but now the railways are regarded as belonging to the country and the great hacendados along their lines act as voluntary police for the prevention of outrages on trains. The immunity of passenger trains in this country from robbery and accident is a matter for congratulation, as showing the excellent order which is maintained throughout the Republic."

A Singular Accident.

While Mr. Franklin Duane, a member of the Auburn engineer corps of the Pennsylvania Schuylkill Valley road, was walking, in company with another member of the corps, on the Philadelphia & Reading road, at a point about 1,500 ft. below the Canal cut, and opposite Crossing No. 3, on the Schuylkill Valley, yesterday morning, he stepped aside to let the express from Pottsville pass, and just as the last car got by he was struck a stunning blow on the forehead by a lump of coal about 3 in. square, which felled him to the ground and inflicted an ugly and painful wound, though, we are pleased to state, not serious. It seems the coal must have been caught by the whirl of the rapidly-running train, and striking a wheel, deflected with the result stated. Crossing No. 3 appears to be a sort of a stumbling-block in Mr. Duane's way, as almost at the same place, last July, he was stricken by sunstroke.—*Pottsville Miners' Journal*, March 16.

The Lucky Car.

The trainmen on the Western & Atlantic road have been watching anxiously for the last three months for a car with the number of the year. They were made happy yesterday by the appearance of car No. 1886, which passed through Atlanta on its way to Florida. It is dark brown in color and belongs to the A. A. D. Line.—*Atlanta (Ga.) Constitution*, March 23.

A Pass Swindler.

Mr. Geo. C. McMichael, General Manager of the Wisconsin, Iowa & Nebraska Railroad, sends us the following, under date of March 17:

"Through your columns I desire to notify railroad officials and the public to pay no attention to a pass circular, dated Milwaukee, Wis., January, 1886, and signed by R. F. Wilson, President of the Wisconsin, Iowa & Nebraska Railway (Diagonal Route).

"Requests for exchange of passes have been made through this circular upon the strength of the acquaintance of this company, such a one having been sent to Mr. John Adams, General Superintendent of the Fitchburg Railroad, Boston.

"This circular is a fraud, and no attention should be paid to the request, and I trust that all roads will cancel such passes as have been issued upon it.

"The office of this company is at Marshalltown, Iowa, and Mr. R. T. Wilson, New York city, President."

Railroading in Florida.

A correspondent of the New York *Evening Post* gives the following graphic account of the bustle and hurry associated with railroad traveling in the land of flowers: "It was easy to come to De Land, and it had not occurred to us but that it might be equally easy to leave it, when once one had decided to go. It is true things are not managed here just as they are in some other places. Not long ago two gentlemen stopping at a hotel near us had resolved upon leaving here by the early train which is currently supposed to meet the early boat going up the river. When they reached the station they found the fireman asleep, and the engineer I know not where. The drowsy officer was roused and persuaded to get up steam. Now, this is not the operation of a moment, and it was half an hour before the engine was ready to start. But it did start, and the anxious travelers with it. When they reached the landing the boat had been and gone. Everybody save the strangers was perfectly placid over this circumstance. What if the boat had gone? In the course of time another would come up the river.

"It may be that a like circumstance will not so readily occur now that there is a railroad to which one can flee in such a disappointment. When we had set the time to depart we remembered this incident, and said we would make sure. We chose the night boat, and the train had started heretofore at 5 o'clock in the afternoon. The station agent, on being questioned, appeared surprised, and said he 'didn't know what time the train would start the next day. Perhaps we had better come down the next day and see.' This appeared inexplicable to us, but we had to make the best of the oracle. The next day we went and inquired what time we should come down in the afternoon, so that we need not miss the connection with the boat. The man looked up in a startled and dazed way, and then remarked that 'he did not know; he reckoned about 5.'

"No," spoke up another man who was present, 'if you're here by 6, it will be ample time'; then, making another calculation, 'Half-past 6 will do.'

"So we were, in a measure, left to select our own time, and naturally we selected it so early that we waited an hour and a half at the station. The cars started at 7, and the boat had been waiting a long time for us. This arrangement is insupportable. We stop thinking of it, with the conclusion that it is unnecessary for us to understand everything, and I challenge anybody to fathom the mysteries of the complications here."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fe, annual meeting, at the office in Topeka, Kan., April 15.

Chicago & Alton, annual meeting, at the office in Chicago, April 5.

New York Central & Hudson River, annual meeting, at the office in Albany, N. Y., April 21.

Panama, annual meeting, at the office in New York, April 5, at noon.

St. Louis & San Francisco, special meeting, at the office in St. Louis, May 12, to vote on the lease of the Kansas City & Southwestern road.

Union Pacific, annual meeting, at the Meionaou in Boston, at 10 a. m., on March 31.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Rock Island & Pacific, 1½ per cent., quarterly, payable May 1, to stockholders of record on March 27.

Evansville & Terre Haute, 1 per cent., quarterly, payable April 1.

Mineral Range, 2½ per cent., quarterly, payable April 5, to stockholders of record on March 31.

Missouri Pacific, 1½ per cent., quarterly, payable April 1, to stockholders of record on March 24.

Oregon Railway & Navigation Co., 1½ per cent., quarterly, payable April 1, to stockholders of record on March 20.

Woodruff Sleeping & Parlor Coach Co., 1½ per cent., quarterly, payable April 1.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *Southern Time Convention* will hold its spring meeting at the Grand Hotel in Cincinnati, on Wednesday, April 14.

The *General Time Convention* will hold its spring meeting at the Grand Hotel in Cincinnati, on Wednesday, April 14.

The *Association of American Railroad Superintendents* will hold its next meeting in Cincinnati on Thursday, April 15.

The *American Society of Mechanical Engineers* will hold its next meeting in Chicago, on Tuesday, May 25.

The *Master Car-Builders' Club* will hold its regular monthly meetings through the winter at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its monthly meetings at its rooms in the Boston & Albany passenger station in Boston, on the evening of the second Wednesday in each month.

The *Western Railway Club* will hold its regular monthly meetings at its rooms, No. 103 Adams street in Chicago, on the third Wednesday in each month.

Foreclosure Sales.

The *Denver & New Orleans* road was sold under foreclosure of mortgage in Denver, Col., March 18, and was bought for \$3,117,358, by Mr. J. S. Brown, agent for the Mercantile Trust Co., of New York, trustee under the mortgage. The road extends from Denver, Col., to Pueblo, 125 miles, with 13 miles of branches. The purchase money represents the bonds and accrued interest. It is understood that the bondholders have completed arrangements for the organization of a new company and the extension of the road.

National Association of General Passenger and Ticket Agents.

The meeting of the National Association of General Passenger and Ticket Agents was held at the Grand Pacific Hotel in Chicago, March 16, President Taylor in the chair. There

was considerable discussion as to the necessity of continuing the Association, a large part of its business having been transferred to the district associations, but it was finally decided to continue it on the present basis. Notice was given of an amendment to the by-laws to be acted on at the next meeting to make the meetings yearly instead of half yearly. Several questions of reduced rates to meetings and conventions were referred to the local committee. The regulation adopted by the General Baggage Agents for the transportation of corpses were discussed, but no action taken. The time of sale of tourist tickets was made from May 15 to Jan. 1.

After electing officers for the ensuing year it was decided to hold the next meeting at New York in September, and the Association adjourned.

ELECTIONS AND APPOINTMENTS.

Boston & Lowell.—Mr. W. F. Simonds has been appointed Superintendent of the Southern Division in place of J. F. Crockett, resigned.

Buffalo & Williamsville.—The directors of this new company are: Charles Berrick, J. S. Buell, Leonard Dodge, John A. Donaldson, R. R. Hefford, C. C. Pickering, F. D. Stow, James Tillinghast, Byron J. Tillman, Wm. P. Taylor, E. S. Turner, George Urban, Jr., Buffalo, N. Y.; N. P. Stanton, New York.

Central Traffic Association.—The following circular from Commissioner George R. Blanchard is dated Chicago, March 8: "Mr. George H. Daniels has this day been appointed Assistant Commissioner of this Association, in immediate charge of the Passenger Department. Correspondence relating to passenger subjects should be addressed to him at 205 La Salle street, Chicago."

Chicago, Burlington & Northern.—The following circular from General Manager George B. Harris is dated St. Paul, Minn., March 20: "Until further advised, car service reports and car tracers should be addressed to Mr. W. H. Holcombe, General Superintendent at La Crosse, Wis. Remittances for balances should be made to, and drafts for same should be drawn on, Mr. Frank Dabney, Cashier at St. Paul, Minnesota."

Chicago, Freeport & St. Paul.—At the annual meeting in Freeport, Ill., March 24, this company chose the following officers: President, William O. Wright; Vice-President, John F. Smith; Secretary, M. H. Wilcoxon, all of Freeport; Treasurer, William P. Watson, of New York.

Chicago, Kansas & Nebraska.—The directors of this company are: E. S. Conwell, F. M. Darrah, C. W. Jones, Atchison, Kan.; S. S. Brown, George W. Samuels, St. Joseph, Mo.; M. A. Law, Trenton, Mo.; M. A. Parker, Chicago.

Chicago & Northwestern.—Mr. A. Barker has been appointed Master Painter. He was formerly on the Chicago, Burlington & Quincy, and for some time past has been in the Pullman shops.

Cincinnati, Jackson & Mackinaw.—The officers of this consolidated company are: President, W. C. Sheldon, New York; Vice-President and General Manager, J. M. C. Marble; Treasurer, Richard Smith, 161 Broadway, New York; Secretary and Assistant to the General Manager, G. L. Marble; Superintendent of Transportation, L. W. Buckmaster; Chief Engineer, J. W. Rimer, General Freight and Passenger Agent, H. R. Johnston, Assistant General Freight and Passenger Agent, F. P. Jeffries; Auditor and Purchasing Agent, G. H. Wapner; General Attorney, I. W. Alexander; Master Mechanic, E. F. Marshall; Superintendent of Telegraph, G. L. Schenck; Master Carpenter, John Wilkinson; Roadmaster, John S. McGraw. The offices are in Van Wert, O., except those of the President and Treasurer.

Eastwarrill.—At the annual meeting in Charleston, S. C., March 9, the following directors were elected: R. C. Barkley, John Harlin, L. Lissberg, S. J. Pregall, A. L. Merriam, A. A. Dame, A. A. Howlett. Mr. R. C. Barkley was subsequently elected President, and Mr. A. L. Merriam, Secretary.

Farmers' Railroad & Steam Portage Co.—At a meeting held in Walla Walla, Wash. Ter., March 11, the following officers were elected: President, B. L. Sharpstein; Vice-President, F. W. Paine; Treasurer, Wm. O'Donnell; Secretary, Max Baumeister.

Gulf, Colorado & Santa Fe.—At the annual meeting in Galveston, Tex., March 23, the following directors were chosen: Leon Blum, Walter S. Davis, J. H. Hutchings, H. Kemper, George Sealy, J. E. Wallis and R. S. Willis, all of Galveston.

Jeffersonville, Madison & Indianapolis.—The office of Chief Train Dispatcher has been removed from Jeffersonville to Columbus, Ind. Lewis Guernsey, who has been Chief Clerk to J. B. Safford, Master of Transportation, has been appointed Assistant Chief Train Dispatcher.

Massachusetts Civil Engineers' Association.—The officers elected for the ensuing year are as follows: President, Prof. George L. Vose; Vice-President, L. F. Rice; Secretary, Horace L. Eaton; Treasurer, Henry Mauley; Librarian, Henry D. Woods; Auditor, F. P. Starks.

Mississippi Railroad Commission.—The Legislature has elected Messrs. William McWillie, J. T. Sessions and J. C. Kyle Railroad Commissioners of the state of Mississippi.

Nashville, Chattanooga & St. Louis.—The following circular from President J. W. Thomas is dated Nashville, Tenn., March 18: "At a meeting of the board of directors held on Wednesday, March 17, Mr. J. H. Ambrose was elected Secretary and Treasurer of this company."

National Association of General Passenger & Ticket Agents.—At the meeting in Chicago, March 16, the following officers were elected: President, J. N. Abbott, New York, Lake Erie & Western; Vice-President, A. C. Dawes, Hannibal & St. Joseph; Secretary and Treasurer, A. J. Smith, Cleveland, Columbus, Cincinnati & Indianapolis. Executive Committee, W. S. Baldwin, Louisville, New Albany & Chicago; S. F. Boyd, Minneapolis & St. Louis; J. R. Buchanan, Sioux City & Pacific; C. H. Cromwell, Atlanta & West Point; A. S. Hanson, Boston & Albany, and H. M. Johnson, Indiana, Bloomington & Western. General Committee, J. R. MacMurdo, Richmond & Allegheny; J. S. Emory, Rochester & Pittsburgh, and D. Wishart, St. Louis & San Francisco.

New York, Bloomsburg & Western.—The directors of this new company are: J. C. Brown, David Lowenberg, A. Z. Schoch, E. C. Wells, Bloomsburg, Pa.; John A. Blair, Jersey City, N. J.; W. W. Trask, Newburg, N. Y.; D. Messmore, New York.

New York, Ontario & Western.—Mr. Thomas Swinyard has been appointed Assistant to the President of this company, taking effect March 1.

New York, Woodhaven & Rockaway.—At the annual

meeting, March 24, the following directors were chosen: A. S. Hatch, J. M. Oakley, John B. Thompson, John H. Sutphin, Martin Fresig, F. H. Cassidy, D. D. Conover, John Birdsell, Moses Mehrbach, W. D. Hatch, John Straiton, W. A. Thompson, C. B. Orcutt.

Ogdensburg & Lake Champlain.—Mr. D. D. Ranlett has been chosen Treasurer in place of H. A. Church, resigned.

Ontario & Sault Ste. Marie.—At the annual meeting in Toronto, Ont., March 17, the following officers were chosen: President, Joseph Hickson; Vice-President, Wm. Gooderham; directors, John Bell, K. Chisholm, George A. Cox, J. M. Ferris, Robert Jaffray, J. M. Williams, Edmund Wragge.

Oregon & Washington Territory.—The directors of this new company are Jacob Frazer, W. S. Byers, H. L. Marston, W. W. Cavness, H. W. Wheeler, W. T. Chalk, B. Alexander and John J. Balleray. The office is in Pendleton, Oregon.

Pennsylvania.—At the annual election in Philadelphia, March 23, the old directors were re-elected, as follows: George B. Roberts, Wistar Morris, Alexander M. Fox, Alexander Biddle, N. Parker Shortridge, D. B. Cummins, Henry D. Welsh, John Price Wetherill, William L. Elkins, William Thaw, H. H. Houston, A. J. Cassatt and C. A. Griscom.

Pennsylvania Company.—The following circular has been issued by General Passenger Agent E. A. Ford: "Mr. Frank Van Dusen, Assistant General Passenger Agent of the Pittsburgh, Cincinnati & St. Louis Railway, is hereby promoted and appointed to the position of Chief Assistant General Passenger Agent for the companies above named, in place of Mr. Charles O. Scull, resigned; appointment to take effect from date. He has authority to conduct local and general correspondence; to issue instructions to all subordinates in regard to passenger rates, tickets, and the various matters pertaining to passenger business, using the signature of the General Passenger Agent, or his own, as circumstances may seem to require. When the General Passenger Agent is absent, Mr. Van Dusen will represent and act for him."

Rochester & Pittsburgh.—The Court of Common Pleas of Elk County, Pa., has appointed Mr. Tatlow Jackson Receiver of this road in Pennsylvania.

Texas & Pacific.—The following circular, issued by General Superintendent Egbert, is dated March 10: "Mr. L. S. Thorn, Acting Division Superintendent of the New Orleans Division, has been confirmed as Superintendent of that division, Mr. George Dimmick having resigned. The jurisdiction of Mr. Thorne is extended over the Eastern Division, taking effect this date."

Mr. D. E. Grove has been appointed General Roadmaster of the Eastern Division, with headquarters at Marshall, Tex., in place of J. L. Turner, resigned. Mr. Grove has for two years past held a similar position on the Missouri Pacific.

Texas & St. Louis.—Mr. W. R. Compton has been appointed General Superintendent with headquarters at Texarkana, Texas.

Toledo, Cincinnati & St. Louis.—By direction of the purchasers of this property, General Superintendent Pettibone announces: "Mr. Joseph O. Osgood is appointed Chief Engineer, and in charge of maintenance of way, in place of H. A. Young, who is appointed Assistant Engineer. All other officers will retain their positions and be respected accordingly."

Toledo, Columbus & Southern.—Mr. T. H. McLane has been appointed Auditor and Car Accountant of this road.

United New Jersey.—Mr. A. L. Dennis has been chosen President in place of Mr. John G. Stevens, deceased. Mr. Dennis has been Vice-President since the present company was formed, and was President of the New Jersey Railroad & Transportation Co. before that time.

Virginia Construction Co.—The organization of this company is announced as follows: James B. Pace, President, Richmond, Va.; T. C. Leake, Jr., Vice-President, Memphis, Tenn.; R. H. Temple, Chief Engineer, Memphis, Tenn.; R. L. Traylor, Secretary, Memphis, Tenn.; W. C. Watts, Treasurer, Memphis, Tenn.; J. W. Daniel, Auditor, Memphis, Tenn. The company is organized to build the extension of the Memphis, Birmingham & Atlantic road.

Wisconsin, Illinois & Iowa Bridge Co.—The incorporators are George B. Harris, B. E. Linehan, J. J. Linehan, Wm. S. Molo, and A. E. Touzalin. Office in Dubuque, Iowa.

Woodruff Sleeping & Parlor Coach Co.—At the annual meeting the following directors were elected: D. C. Corbin, Wm. G. Johnston, E. Poulson, J. M. McClintock, Job H. Jackson, E. J. Unger, Wilson McCandless, Henry Whelen, James J. Donnell. The officers are: D. C. Corbin, President; Wm. G. Johnston, Vice-President; Augustus Trump, Secretary and Treasurer; John C. Paul, General Manager. Mr. Job H. Jackson declined re-election as President.

PERSONAL.

—Mr. J. F. Crockett has resigned his position as Superintendent of the Southern Division of the Boston & Lowell road.

—Mr. H. A. Church has resigned his position as Treasurer of the Ogdensburg & Lake Champlain Railroad Co. to engage in other business.

—Mr. Charles Latimer has resigned his position as Chief Engineer of the New York, Pennsylvania & Ohio road, after a long term of faithful and efficient service.

—Mr. Richard W. Sherman, an engineer of excellent reputation, and formerly of the firm of Sherman & McDonough, contractors, has been appointed City Engineer of Utica, N. Y., by the Mayor.

—Mr. Theodore N. Ely, Superintendent of Motive Power of the Pennsylvania Railroad, was married March 23, to Miss Susan Wierman, of Harrisburg, the daughter of Mr. T. W. Wierman, President of the Pennsylvania Canal Co. Mr. and Mrs. Ely have gone to Florida for a wedding trip.

—Mr. George M. Bogue has resigned his position as Arbitrator of the Southwestern Railway Association, the Northwestern Traffic Association and the Central Iowa Association. Mr. Bogue has filled these positions very acceptably, and now withdraws in order to give his entire attention to his private business.

—Mr. Alfred Beers, who died in Bridgeport, Conn., March 12, aged 64 years, was a conductor on the Naugatuck Railroad for 34 years, entering the service of the company in 1851. He continued to run a train until about two years ago, when he retired on account of age and infirmity, and the company granted him a pension.

—Mr. J. W. Midgley has declined the position of Arbitrator of the Associated Lines of Kentucky, Tennessee and Alabama, which had been offered to him, on the ground that

his duties as Commissioner of the Southwestern Railway Association will not leave him sufficient time to acquire the necessary familiarity with Southern traffic questions.

—Mr. Thomas W. Swinyard, who has just been appointed Assistant to the President of the New York, Ontario & Western Co., was at one time General Manager of the Great Western Railway of Canada. He has been for some time past President of the Dominion Telegraph Co., and has had his residence in Hamilton, Ont. He will remove to New York, where his headquarters will be located.

—Mr. Edward G. Brown, a well-known contractor, died at his residence in Elizabeth, N. J., March 24, aged 70 years. Mr. Brown was born in Maine, but had lived in New Jersey for many years. He built the long pile bridge of the New Jersey Central road over Newark Bay, and also the substructure for the bridge over the Raritan River at Perth Amboy, and had executed many other important contracts principally for bridge and dock work.

—Mr. Daniel Hull, one of the oldest locomotive engineers in the country, died at his residence in Chambersburg, Pa., March 3. Mr. Hull was born in Lancaster County, Pa., in 1798, and in early life learned the trade of carpenter. In 1834-52 years ago—he commenced work on a railroad by accepting the position of fireman on one of the first locomotives of the old State road from Philadelphia to Columbia, and in the following year was given charge of an engine. In 1838 he left the State road and went to the Cumberland Valley Railroad, where he remained 12 years, for 7 of those years having charge of the shops at Chambersburg. After a short service on the Erie road he went to the Pennsylvania Railroad, and in 1854 accepted a position with Norris & Brothers, locomotive builders, serving there and with the Lancaster Locomotive Works for several years. He finally returned to the Cumberland Valley road, where he was again given charge of an engine, and continued to run it until 1867, when he met with his first accident, receiving serious injuries. Since that time he has been employed in the company's shops. During his long experience in running and setting up locomotives, Mr. Hull suggested many improvements, most of which have been adopted. He was father of Mr. A. S. Hull, now Master Mechanic of the Cumberland Valley road.

—Col. Charles F. M. Garnett died in Norfolk, Va., March 6, aged 76 years. He was born in Virginia and learned his profession as an engineer on the Chesapeake & Ohio Canal, under the late Charles Ellett, who will be remembered as one of the foremost engineers of his day. He afterwards served under Mr. Moncre Robinson as Assistant Engineer of the Richmond & Petersburg and the Richmond, Fredericksburg & Potomac roads, and was Chief Engineer of the Raleigh & Gaston road when it was first constructed. In 1842 he was appointed State Engineer of Georgia, and in that capacity had charge of the location and construction of the Western & Atlantic road, which was owned by the state. He selected the site for the southern terminus of the line, where the city of Atlanta has since sprung up. During his service in Georgia he received an injury accidentally which lamed him for life. Subsequently he served as Chief Engineer of the Charlotte & South Carolina, the Columbia & Augusta, the Nashville & Chattanooga, the Memphis & Charleston, the Richmond & York River and the Virginia & Tennessee, now part of the Norfolk & Western road. In 1856, on invitation of the Emperor of Brazil, he went to that country, where he had charge as Chief Engineer of the building of the Dom Pedro II. Railroad. He returned to the United States in 1859. During the war he served in the engineering department of the Confederate Army, and for some time had charge of the railroads in military control. Since the war Col. Garnett has taken no active part, although he has been employed on a number of occasions as consulting engineer.

—General John H. Devereux died in Cleveland, O., March 17, of cancer of the stomach. He had been suffering from this disease for some time, but it was not until lately that the true nature of the complaint was suspected. Although very weak, he continued to perform his official duties until a few days before his death. General Devereux was born in Boston, April 5, 1832, his father being a sea captain, and received his education at the Academy in Portsmouth, N. H. When 16 years old he entered the railroad service as rodman in an engineering corps on the Cleveland, Columbus & Cincinnati road and rose gradually to be Assistant Engineer. In 1851 he was appointed Assistant Engineer of the Cleveland, Painesville & Ashtabula road, then under construction. In 1853 he went South and from that time until the breaking out of the war he was employed in railroad surveys and construction in Tennessee and Alabama. Shortly after the beginning of the war General Devereux entered the service of the Government and was given a position under General Callum, who soon after appointed him Superintendent of Military Railroads in Virginia, where he distinguished himself by his rapid and successful organization of the railroad service for the Army of the Potomac. He remained in that position until March, 1864, when he was appointed General Superintendent of the Cleveland & Pittsburgh road. In 1868 he was made Vice-President of the company, but a few months later resigned to take the position of Vice-President of the Lake Shore Railroad Co. Subsequently he was chosen President of that company and held that position until the formation of the present Lake Shore & Michigan Southern Co., when he was appointed Vice-President and General Manager of the line. In June, 1873, he left this company and became President of the Cleveland, Columbus, Cincinnati & Indianapolis and was afterwards chosen Vice-President and subsequently President of the old Atlantic & Great Western road, retaining the management of both lines. In 1874 he was appointed Receiver of the Atlantic & Great Western Railroad and retained that position until the receivership was terminated and the New York, Pennsylvania & Ohio Railroad Co. was organized. In 1881 he retired from his connection with that company, still retaining the presidency of the Cleveland, Columbus, Cincinnati & Indianapolis and also serving for two years as President of the Cincinnati, Hamilton & Dayton. General Devereux was also President and a director of several subordinate companies and was Vice-President of the Pittsburgh, McKeesport & Youghiogheny. He was always regarded as one of the most trusted assistants of the late William H. Vanderbilt, and he conducted the negotiations which ended in the purchase by that gentleman of the controlling interest in the New York, Chicago & St. Louis road. General Devereux was a Freeman of high standing and was an active member of the Protestant Episcopal church, taking a prominent part in its general convention for several years past. He married in 1851 Miss Antoinette C. Kelsey, of Cleveland, who, with four children, survives him.

TRAFFIC AND EARNINGS.

Central Passenger Committee.

The following circular from Commissioner Daniels is dated Chicago, March 19: "At a meeting of this Committee, held at the Grand Pacific Hotel, Chicago, Thursday, March 18, the following resolution was unanimously adopted: 'Resolved, That the rates from Columbus, O., and all territory affected by reductions which have been made there, be

restored to full tariff to-morrow morning by all lines members of this Committee, and be maintained at full tariff rates, regardless of outside competition; all exceptions that have been heretofore made in regard to it are withdrawn, and all ticket sellers placed under the penal rule of this Committee.

"In accordance with the above, I hope that no agent in the territory of this Committee will deviate in any manner whatever, directly or indirectly, from the printed tariff rates, and that should there be a deviation on the part of the agent of any line, either a member of this Committee or an outside line, that such deviation will not be met by any other agent, but that the facts will be promptly cited to the General Passenger Agent of the line interested, and through him the information communicated to this office, when the matter will be taken up promptly with the proper officer of the offending line, with a view of preventing demoralization and securing proper revenue to all the lines in interest."

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Two months to Feb. 28:				
	1886.	1885.	Inc. or Dec.	P. c.
Ala. Gt. South...	\$180,543	\$203,241	D. \$12,698	6.3
Can. N. O. & T. P.	408,015	397,726	I. 10,289	2.6
Des. M. & Ft. D.	50,351	52,935	D. 2,584	4.9
Ft. Worth & D.	50,169	47,237	I. 2,932	6.2
Georgia Pacific...	122,259	109,998	I. 12,261	11.2
Mobile & Ohio...	314,375	309,175	D. 5,200	1.6
Net earnings...	72,738	61,711	D. 11,027	17.9
Nash. C. & St. L.	373,170	359,905	I. 13,265	3.7
Net earnings...	147,062	148,774	D. 1,712	1.1
N. O. & Nor'east.	113,608	125,994	D. 12,386	10.9
Northern Cen...	831,084	793,265	I. 37,819	4.8
Net earnings...	317,588	304,551	I. 13,037	4.3
Pennsylvania...	6,970,990	6,353,202	I. 617,788	9.7
Net earnings...	2,210,125	1,821,044	I. 389,081	21.4
Vicks. & Mer...	91,047	78,474	I. 12,573	16.1
Vick., Sare. & P.	85,943	57,039	I. 28,904	50.7

Month of January:				
	1886.	1885.	Inc. or Dec.	P. c.
Atch. T. & S. F.	\$862,203	\$1,115,697	D. \$253,494	22.9
Net earnings...	296,272	444,905	D. 148,633	33.4
Maine Central...	187,127	183,194	I. 3,933	2.2
Net earnings...	35,639	37,477	D. 1,838	4.9
St. Jo. & Gd. I.	53,359	86,498	D. 33,139	60.3
Net earnings...	7,190	25,993	D. 18,803	72.3

Month of February:				
	1886.	1885.	Inc. or Dec.	P. c.
Ala. Gt. South...	\$96,391	\$98,450	D. \$2,059	2.1
Can. N. O. & T. P.	208,150	196,079	I. 12,071	6.2
Des. M. & Ft. D.	30,776	27,724	I. 3,052	10.9
Ft. Worth & D.	25,519	24,519	I. 1,000	4.1
Georgia Pacific...	63,864	52,694	I. 11,170	21.1
Mobile & Ohio...	147,570	164,494	D. 16,924	10.3
Net earnings...	30,383	35,179	D. 4,796	13.7
Nash. C. & St. L.	184,651	174,191	I. 10,460	6.0
Net earnings...	74,310	69,853	I. 4,457	6.3
N. O. & Nor'east.	50,906	64,107	D. 13,201	25.3
Northern Central.	430,961	389,048	I. 41,913	10.7
Net earnings...	173,278	136,818	I. 36,460	26.6
Pennsylvania...	3,551,455	3,077,680	I. 473,775	15.3
Net earnings...	1,267,584	830,460	I. 437,124	52.7
Tol. A. A. & N. M.	21,094	17,129	I. 3,965	23.2
Vicks. & Mer...	49,802	36,183	I. 13,619	37.6
Vick., Sare. & P.	43,736	26,520	I. 17,216	64.8

Second week in March:				
	1886.	1885.	Inc. or Dec.	P. c.
Buff. R. & Pitts.	\$27,522	\$21,574	I. \$5,948	27.6
Canadian Pac.	125,000	94,006	I. 30,994	33.0
Chi. & Alton...	150,028	140,217	I. 9,811	6.9
Chi. & East. Ill.	33,110	34,879	D. 1,769	5.3
Chi. Mil. & St. P.	437,000	460,920	D. 23,920	5.1
Chi. & Nor'west.	460,200	422,000	I. 38,200	9.0
C. I. St. L. & C.	51,615	49,240	I. 2,375	4.9
Long Island...	49,053	40,211	I. 8,842	22.0
Louis. & Nash...	262,143	303,175	D. 41,032	13.5
Mil. & Northern...	12,935	12,278	I. 657	5.3
St. L. & San F.	79,688	83,870	D. 4,182	5.0
Wab. St. L. & P.	237,774	225,457	I. 12,317	5.4

Third week in March:				
	1886.	1885.	Inc. or Dec.	P. c.
Chi. Mil. & St. P.	\$48,000	\$469,595	D. \$1,595	0.3
Mil. L. S. & W.	31,553	29,400	I. 2,153	7.3
St. L. & San F.	91,900	87,800	I. 4,100	4.6

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

The Canadian Canals.

The Toronto (Ont.) *Monetary Times* says: "In reply to a deputation, the Minister of Public Works has stated that the St. Lawrence canals will be enlarged in a somewhat leisurely way, and that the expenditure cannot be doubled up quite as fast as impatience may desire. The circumstance of the Welland Canal being of greater capacity than the St. Lawrence canals gives an advantage to foreign commerce over our own; a state of things which no one would think of perpetuating. But the necessity of putting a curb on the expenditure on public works is urgent and may soon become paramount in Federal finance. At the same time, no hope is held out that the harbor dues of Montreal will be decreased. There is an obvious limit to what the nation can do in the way of expenditure, and the large deficit admonishes us that that limit is within near sight, and may soon be felt as a restraining influence in the national finances."

"There is little prospect of the tolls on Canadian canals being abolished. The fear that the abolition would benefit forwarders instead of the public has a historic basis to rest upon; and it is significant that the interest most likely to benefit by it is most clamorous for the public sacrifice. There would be small encouragement to go on enlarging the canals, if, when completed, they were to yield no direct return on the capital expended. Our great water way cannot be compared to the Erie Canal; the superior facilities which it affords are worth more than the difference in the tolls. The forwarders, too, have shown a great lack of enterprise in not providing proper elevating facilities at Kingston. They ask the government to do everything, while they themselves do as little as possible. Already \$42,000,000 have been expended on the canals, and future expenditures must be kept within some rational limit."

"There does not seem to have been any good reason why the second enlargement of the Welland Canal should have preceded the enlargement of the St. Lawrence canals, but there are many reasons why the converse precedence should have been observed. And, in future, preference, in point of time, should be given to the St. Lawrence canals; though, as the great Northwest develops, the reasons for it will constantly get less and less. When all the canals are enlarged to a depth of 14 ft., we shall be in a position to command all the export trade which will be compatible with the volume of our imports. But, once more, let us not deceive ourselves: a certain proportion between exports and imports will be maintained in spite of all we can do. When we have completed the enlargement now in progress, the total cost of the canals will not be less than \$54,000,000; but even then we shall not be able to divert the great body of western American traffic."

Coal.

Coal tonnages for the week ending March 13 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite...	635,000	594,525	I. 40,475	6.8
Eastern bituminous...	128,104	183,964	D. 55,860	30.4
Coke...	62,047	49,231	I. 12,816	26.1

A meeting was held in New York, March 24, at which all the anthracite companies were represented except the Penn-

sylvania Coal Co. At this meeting a preliminary agreement was made, the chief points of which are that April production shall not be over 2,000,000 tons; the production for the year shall be 33,500,000 tons, and an immediate advance of 25 cents per ton shall be made in prices. Another meeting will be held to decide upon the allotment to each company.

The coal tonnage of the Chesapeake & Ohio road for the two months to Feb. 28 was for the year, 188,167; last year, 179,719; increase, 8,448 tons, or 4.7 per cent.

The output of the Nova Scotia mines in 1885 was 1,350,220 tons, against 1,389,205 in 1884; a decrease of 39,075 tons, or 2.8 per cent. Shipments from the mines were:

	1885.	1884.	Inc. or Dec.	P. c.
Canadian points...	1,214,295	1,184,867	I. 29,428	2.5
United States...	34,483	64,515	D. 30,032	46.2
West Indies...	5,732	9,595	D. 3,863	40.2
South America...	2,693	2,693	D. 0	0.0

Total... 1,254,510 1,261,670 D. 7,160 0.6
There was an increase in the Canadian sales, but a decrease in all the foreign shipments.

Cumberland coal shipments for the week ending March 13 were 8,654 tons; week ending March 20, 1,332 tons. Total to March 20 this year, 369,633; last year, 408,573; decrease, 38,940 tons, or 9.6 per cent. Mining is almost entirely stopped by the strike.

Pennsylvania Railroad coal tonnage for the week ending March 20 was:

	Coal.	Coke.	Total.	1885.
Line of road...	102,159	71,353	173,512	167,904
From other lines...	84,292	2,842	87,134	83,645
Total...	186,451	74,195	260,646	251,549
Year to March 20...	2,586,093	529,479	3,115,572	2,734,683

Increase for the week, 9,067 tons, or 3.6 per cent.; increase for the year, 380,889 tons, or 13.9 per cent.

Cotton.

Cotton movement for the week ending March 19 is reported as follows, in bales:

	1886.	1885.	Inc. or Dec.	P. c.
Receipts...	30,212	32,440	I. 2,228	6.9
Shipments...	59,236	31,417	I. 27,819	88.6
Stock, March 19...	392,722	170,155	I. 222,567	130.9

The total movement from plantations for the crop year to March 19 is estimated at 5,926,180 bales, against 5,357,088 last year, 5,291,282 in 1883-84, and 6,232,800 in 1882-83.

Petroleum.

The production and shipments of the Pennsylvania and New York oil wells in February are given by *Stonell's Petroleum Reporter* as follows, in barrels of 42 gallons:

	1886.	1885.	Inc. or Dec.	P. c.
Production...	1,604,848	1,437,884	I. 166,964	11.6
Shipments...	2,632,794	1,895,021	I. 737,773	39.0
Stock, Feb. 28...	34,082,775	36,757,137	D. 2,674,362	7.3
Producing wells...	21,865	21,087	I. 778	3.7

Of the total production the Allegheny District in New York, furnished 9.4 per cent.; the Bradford District in Pennsylvania, 35.4; the Warren District, 13.5, and the Lower District 41.7 per cent.

Stock on hand decreased 427,946 barrels during the month, that being the excess of shipments over production.

The shipments were divided as follows:

	Crude.	Refined.	Total.	P. c.
New York...	573,097	63,863	636,960	31.3
Philadelphia...	528,296	32,211	560,507	27.6
Baltimore...	97,723	12,177	109,900	5.4
Boston...	17,822	77,529	95,351	4.7
Cleveland...	243,167	...	243,167	12.0
Pittsburgh...	63,480	...	63,480	3.1
Local points...	251,364	72,005	323,369	15.0
Total...	1,774,949	257,843	2,032,794	100.0

In this statement the refined oil is that refined at the Creek refineries, in the oil district. It is reduced to its equivalent in crude, so that the total represents the amount of crude oil shipped to each point whether sent in crude or in refined form.

The Immigrant Clearing House.

A meeting of the Trunk Line Passenger Committee was held in New York, March 23, the affairs of the Immigrant Clearing House being under discussion. The meeting finally adopted resolutions declaring that the Clearing House was prepared to act as agent of all the western connections in the issue of immigrant tickets, but that in view of the outside agencies established the trunk lines will hereafter decline to act as the agents of other companies who, directly or indirectly, permit other parties than the Atlantic lines to act as their agents in the sale of immigrant orders or tickets. Assistant Commissioner Pierson, in accordance with these resolutions, sent out notices to the pool roads stating that the companies had withdrawn from all booking agencies in this country and Europe, and have declined to accept the bookings. The committee has therefore adopted a resolution requesting the steamship companies to consign all immigrants passing through the ports of Philadelphia, New York, Boston, Portland, Halifax, Montreal and Quebec to the agents of the Immigrant Clearing House Committee exclusively, and to book such passengers through to destination upon order.

Indianapolis Car Movement.

For the week ending March 20 there were 19,532 freight cars received and forwarded at Indianapolis against 20,037 for the preceding week.

Transcontinental Freight Rates.

The war in transcontinental freight rates continues without material change, all the lines apparently taking freight at any rates they can get, so that no definite rates can be named. The Pacific Mail Steamship Co. is also said to be taking shipments from New York at very low figures. The report that negotiations were in progress for a settlement does not seem to have been founded on fact.

Transcontinental Passenger Rates.

The cutting of passenger rates to and from Pacific Coast points continues unabated. Round trip tickets are this week sold from Missouri River points to San Francisco and return at \$50, and from Chicago and St. Louis at \$70. Second-class tickets from San Francisco to Kansas City have been sold at \$5. The Pacific Mail Steamship Co. now offers through tickets from New York to San Francisco at \$40.

Central Traffic Association.

A Chicago dispatch of March 24 says: "When the Central Traffic Association met this morning it struck a stumbling block to the progress of its work in the shape of a statement from the Committee on Percentages that it was not ready to report. The committee was given a week more time, and the association settled down to work. Commissioner Blanchard reported that since his selection as Commissioner he had organized east-bound pools from St. Louis, Peoria, Indianapolis, Cincinnati, and Louisville. All the pools had agreed to leave the question of percentages to arbitration. The association took up the question of reports and statistics, and decided that hereafter all matter of that kind shall be sent to Com-

missioner Blanchard, instead of Commissioner Fink, and that the clerks now employed in handling this matter in Mr. Fink's office shall be brought to Chicago and employed by Mr. Blanchard in the same work. Instead of daily reports, Commissioner Fink will be furnished with weekly and monthly statements of business for the use of the trunk lines. An Executive Committee similar to that of the trunk line committee is to be formed, each subpool to have upon the committee its General Manager. This Executive Committee, with Commissioner Blanchard, will have full authority to act on all matters concerning rates.

After the association adjourned for the day the General Managers and General Passenger Agents of the roads represented met and tried to form a pool on east-bound passenger business. The refusal of the Chicago & Atlantic to join any such organization, and the question of differentials, proved serious obstacles and the meeting adjourned without accomplishing anything.

Northwestern Traffic Association.

A meeting was held in Chicago March 24, to agree upon a basis upon which the present pool can be temporarily continued after its expiration. It is no desired to effect a permanent organization now for the reason that within a few months the roads in the association will be compelled to deal with the competition of several new and parallel lines. The chief point at issue is the business done by lake and over the Chicago, St. Paul, Minneapolis & Omaha from Washburne, which that company is not willing to put in the pool.

The tons shipped and earnings (Chicago and Milwaukee to and from St. Paul and Minneapolis) for the five weeks from Feb. 1 to March 7 are reported as follows:

	Tons.	Revenue.	Rev. per ton.
West-bound...	33,770	\$168,830	\$164.94
East-bound...	8,965	30,017	47.317
Wheat milled at local points...	2,619	5,834	2.227

The percentages of revenue by different roads were:

	C. M. & St. P.	C. & N. W.	C. R. I. & P.	C. B. & Q.
West-bound...	28.5	29.3	25.9	16.3
East-bound...	13.0	41.6	34.5	...
Local milled wheat...	65.8	26.5	7.7	...

The Milwaukee & St. Paul fell below its allotted share in each division of traffic, the Northwestern was a little below in west-bound, but far above in east-bound (41.6 per cent. against 32.5 allotted) and wheat milled at local points (26.5, against 16.5), while the Rock Island was a little over in west-bound and east-bound, but behind 7.7 per cent., instead of 11, in wheat milled locally. The total earnings from east-bound freight and wheat milled at local points was \$35,851, against \$168,830 from west-bound freight. The whole east-bound tonnage (11,584 tons) was a little more than one-third of the west-bound, and not more than 5 per cent. of the Chicago east-bound shipments for the same time.

California Through Freights.

Shipments of through freight eastward from California points in January were 5,961 tons, leading items being 597 tons sugar, 576 tons fruit, 519 tons of wine and 641 tons canned goods. These shipments were over the Central and Southern Pacific roads, the reports for the two lines being no longer made separately.

Boston Traffic Notes.

During the month of February the Boston & Albany road received 10,218 freight cars from the New York Central road at Albany.

RAILROAD LAW.

Injury to Drover Traveling on a Pass.

In the case of Carroll against the Missouri Pacific Co., the Missouri Supreme Court holds as follows:

1. A common carrier of goods and passengers for hire is not authorized to contract against his own negligence, on the ground of public policy. [63 Mo., 364; 65 Mo., 569; 74 Mo., 541; 79 Mo., 296; 17 Wall., 357.] The last case cited holds that a stock drover being transported on a railroad with a free pass, for the purpose of caring for his stock, is a passenger for hire, and although the pass stipulates that he will not hold the company liable for injuries, he may, if hurt, maintain an action. This case is parallel with the one here abstracted.

2. A stock drover, by accepting a pass from a railway company, containing the customary stipulations and agreements, does not thereby, during the trip, become the servant of the company.

Subsidy to a Railroad—Compliance with Contract.

In the case of the Gulf, Colorado & Santa Fe Co. against Miller and others, the Texas Supreme Court has reversed the decision of the lower court in favor of the company, holding as follows:

Suit by the railroad company on two of a great number of subsidy obligations executed to the railroad by citizens of Belton, the consideration of which, as expressed on their face, was "the early construction of the Gulf, Colorado & Santa Fe Railway to the town of Belton;" and embraced the following condition: "If the Gulf, Colorado & Santa Fe Railway is not completed to the town of Belton by the first day of March, 1881, then this obligation to become null and void." At the same time these obligations were executed there was also executed and delivered to the railroad by the citizens of Belton a bond obligating themselves to "secure to the company all necessary conveyances for the right of way through the county of Bell and the town of Belton when demanded by it, on any line it may locate that touches the corporate limits of Belton." Held, that in continuing this contract, the provisions of the company's charter bearing upon the subject matter, together with all the facts and circumstances surrounding the parties going to throw any light as to what were the objects and purposes of the contracting parties, must be considered as entering into and forming part of such contract. And it appearing from the evidence as found in the statement of facts that the act of the company in running its road just into the corporate limits of Belton, and running out again and locating its depot upon land of its own situated outside the city limits, was not a full compliance with the terms of its charter, nor the inducements held out to the citizens by the agent of the road in his address to them soliciting the subscription, good faith is not shown, and the company is not entitled to recover. Reversed and remanded.

OLD AND NEW ROADS.

Atchison Topeka & Santa Fe.—This company's statement for January is as follows:

	1886.	1885.	Decrease.	P. c.
Earnings...	\$862,203	\$1,115,697	\$253,494	22.9

posed line across the Indian Territory have begun work on the southern end, running from Sherman, Tex., northward.

Atlantic Avenue Elevated.—The Rapid Transit Commission of Brooklyn has decided on the route for the proposed elevated road reaching from South Ferry to East New York. The route, the main part of which is along Atlantic avenue, is divided into four sections, the first extending from South Ferry to Sixth avenue, the second from that point to Kingston avenue, and the third thence to East New York. The fourth section is a branch road to be built through Boerum street to Fulton, there to connect with the proposed trunk line. Any of these sections can be built separately and the others abandoned, and for that reason Commissioners Lane and Henry entered written protests against the division. They claimed that the Corbin-Richardson syndicate, which will probably subscribe to the stock, will build only the first section to Sixth avenue, near which the Long Island Railroad terminates, and connect with it.

Buffalo, New York & Philadelphia.—A new suit to foreclose the first mortgage on the original Buffalo, New York & Philadelphia road has been begun by Henry Martin and Franklin D. Locke, trustees. The trustees state that this suit has nothing to do with the general plan of reorganization, but is simply intended to compel the payment of the \$90,000 interest due Jan. 1, which was not paid.

Buffalo, Rochester & Pittsburgh.—After the sale of the Rochester & Pittsburgh Railway was made to Adrian Iselin in October by Referee Davy, W. H. Olmsted and other stockholders filed a bill in equity in the Court of Common Pleas, of Elk County, Pa., to have the sale set aside as void in that state, and for a receiver and for an accounting by Brown, Iselin and others. The case was argued at length, and the decision of the Court has just been rendered. Chief Justice Mayer holds that the bill can be maintained, as filed, and that the sale of the railroad in Pennsylvania by Referee Davy was utterly void, and that the act of the company in creating the second mortgage was utterly void by the constitution and statutes of Pennsylvania, and the issuing of the bonds was a void act in Pennsylvania. He also holds that such proceedings are local in their effect and character, and have no extra territorial force, and are not conclusive on the stockholders because the courts in New York had no jurisdiction to pass on the validity of the mortgage as to the property in Pennsylvania, and although the bonds might be void while acting in New York, yet that they are repugnant to the laws and constitution of Pennsylvania, and will not be recognized and enforced by the courts of that state, and that this adjudication in New York directing foreclosure is not binding and conclusive on the courts of Pennsylvania. In accordance with this decision a receiver has been appointed for the road in Pennsylvania. An appeal from the decision will be taken.

Buffalo & Williamsville.—This company has been organized to build a railroad from Buffalo, N. Y., to the village of Williamsville, a distance of about 8 miles. The road is intended for local business entirely.

California Southern.—The statement for December and the year 1885 is as follows:

	December.	Year.
Earnings.....	\$34,230	\$168,167
Expenses.....	47,872	182,531
Deficit.....	\$14,642	\$14,364

This includes only the old road from San Diego to Colton, no business from the Extension having come in until after the close of the year.

Carolina Central.—This company has now let contracts for grading the extension of its road from Shelby, N. C., westward to Rutherfordton, a distance of about 24 miles. The grading to Piny Ridge, about half way, is well advanced. Track has been laid from Shelby to the First Broad River, where a bridge 600 ft. long is to be erected. The masonry is nearly ready and track-laying will be continued as soon as it is erected.

The company has applied to the Circuit Court for an injunction to restrain the Rutherford Railroad Co. and the Massachusetts & Southern Construction Co. from building a railroad on its right of way between Rutherford and Shelby. The company claims that the Rutherford Railroad Co. has sought to occupy a part of the land on which it has bought and paid for the land and on which it has done a large part of the grading.

Central of New Jersey.—In Trenton, March 22, the application to show cause why an order should not be entered for the sale of \$3,000,000 in bonds, pledged by the Philadelphia & Reading Co. at the time it leased the Central road, to secure payment of the floating debt, should not be sold, came up before the Chancellor. Mr. Gowen, for the Reading Co., asked for further delay, and says if the case was postponed he would be able to raise the money and redeem the bonds. Counsel for the trustees under the Reading mortgage also appeared and asked for the delay on the ground that the sale would be injurious to their interest. They also claim that the bonds were issued without authority, and that they should not be sold until it was found that the Central Co. was unable to pay its own debts. After hearing argument the Chancellor said that the only reason the Philadelphia & Reading Co. had been called into the case was because of its connection with the Central. The only defence which could be offered to the application was to say that the debt had been paid. He denied the application of the trustees and ordered a decree to be entered giving the Receiver the right to sell the bonds.

Mr. Gowen subsequently made a personal application to the Receiver, requesting a few days' delay in order that he might be able to redeem the bonds.

Central Pacific.—Work is being pushed on the tunnel and bridges on the extension of the Oregon Division northward from its present terminus. There are 12 tunnels and 21 bridges on the road. Seven of the bridges and 9 of the tunnels are nearly completed. On the remaining 3 tunnels work is in progress night and day. Tunnel No. 9 will be 780 ft. long, with about 400 ft. finished. Tunnel No. 10 is 560 ft. long, with only about 60 ft. remaining between the headings. Tunnel No. 11 is 800 ft. long, with about 500 ft. through. The name of the present terminus has been changed from Portuguese Flat to Lisbon.

The statement for this road for December and the year ending Dec. 31 is as follows, the figures covering 1,850 miles of main line and branches:

	December.	Year.
	1885.	1884.
Earnings.....	\$1,033,122	\$1,189,054
Expenses.....	474,178	585,336
Net earnings..	\$558,944	\$603,718
Per cent. of exps.	49.2	49.2

For the year the gross earnings decreased \$1,612,550, or 10.1 per cent., and the expenses \$1,897,765, or 24.4 per cent., the result being a gain of \$285,215, or 3.4 per cent., in net earnings.

Chautauqua Lake.—The Commission appointed by the Supreme Court to hear the petition of the Point Chautauqua Association for a change of the location of the Chautauqua Lake Railway, after several hearings at Mayville, Buffalo

and Jamestown, filed its decision at Mayville on March 17, approving the original location of the railway. The alternate line proposed by the Association was not only bad in itself, but when compared with the location was wholly unreasonable. The Shore line has almost no grade through the property, and its steepest grade is 60 ft. per mile for a short distance at the north end, and its sharpest curve was 7'; whereas the back or alternate line proposed grades of 100 ft. per mile ascending and descending for nearly a mile each way, with a very short level space at the summit—not much more than would naturally be occupied by the vertical curve—and at the foot of one grade was a 10' curve on the grade; and at the foot of the other an 8' curve also on the maximum grade, reversing into a 5' at its junction with the located line. There was also a sharp reversed curve at the other junction point. The Commissioners, Messrs. C. J. Murray (lawyer), of Dunkirk, J. Satterfield, of Titusville, and R. F. Ewing (civil engineer), of Pine Valley, were unanimous in denying the petition. Among the expert witnesses for the respondent were Messrs. Charles Latimer, J. W. Reynolds (Superintendent Philadelphia & Erie), and Wm. H. Searles, of Cleveland.

Chicago, Burlington & Northern.—A company has been organized, the incorporators being officers of this company, to build a bridge over the Mississippi at Eagle Point, one mile above Dubuque, Ia. By the articles of incorporation the bridge is to be open to all railroad lines desiring to use it, on equitable terms.

Track on this road is now laid from Savanna, Ill., northward about 15 miles, and the work is progressing rapidly. From La Crosse, Wis., northward, tracklaying is also going on, and the rails are down for about 10 miles.

Chicago, Kansas & Nebraska.—This company was organized some time ago to build a line from St. Joseph, Mo., westward through Kansas to the Colorado line, with a branch southwest to the southern line of the state. A provision was also made for shorter branches to Atchison and other points. It has been understood that the company is backed by the Chicago, Rock Island & Pacific. The company has asked the city of St. Joseph to vote a subsidy of \$200,000, promising to begin work at once if that amount is voted.

Chicago, Milwaukee & St. Paul.—A contract has been let to Herman Clark, of New York, for grading, bridging and track-laying the new extension from Ottumwa, Ia., to the Missouri River near Kansas City. Work is to be begun at once and completed by Aug. 1, 1887. Preliminary surveys have been made, but the western portion of the line has not been finally located, nor has the point at which the road will cross the Missouri been decided on.

Chicago & Northwestern.—It is now stated that the proposed branch from the Peninsula Division at Florence to the Gogebic iron range will be built this season, but will extend only to Watersmeet, Mich., where connection will be made with the Milwaukee, Lake Shore & Western road. An agreement has been made which will prevent the building of any more road; under it ore from the Gogebic Range will be shipped to Escanaba as well as to Ashland, the Milwaukee, Lake Shore & Western Co. consenting to divide the business between the two ports, thus giving part of it to the Northwestern.

A survey has been completed for an extension of this company's Anamosa Branch from Anamosa, Ia., westward to Gladbrook, and work will be begun as soon as the weather will permit.

Columbus & Eastern.—The Court has authorized the Receiver of this road to build a branch from Redfield, O., to Zanesville and from Zanesville to the Brush Creek coal district. The Receiver is authorized to issue certificates in payment for construction, and it is said that arrangements have been made by parties who are largely interested in the road to take these certificates and furnish the money.

Corning, Cowanesque & Antrim.—It is reported that this road is to be extended from its present terminus at Harrison Valley, Pa., westward to Olean, by way of Genesee Fork and Shongo and the Honeoye Valley.

Covington & Macon.—A contract has been agreed to between this company and the city of Macon, Ga., under which the company will acquire possession of the old road-bed of the Georgia Railroad in that city on payment of \$4,467 and a yearly rental of \$1,000. The contract is made subject to the right of the Georgia Railroad Co. to the old road-bed, but the city agrees, in case that company should demand possession of the track, to provide the new road with another line into the city. The contract has been finally signed and settles the question of entrance of the new road into Macon.

Danville & Northwestern.—This company has been chartered by the Virginia Legislature to build a railroad from Danville, Va., to Balcony Falls, where it will connect with the Richmond & Allegheny, and through the Lexington Branch of that road, with the Valley Railroad and the Baltimore & Ohio. The incorporators held a meeting in Danville, March 20, and resolved to open books of subscription to the stock and to meet April 1 to complete the organization.

Dayton & Hocking Valley.—This company has been organized to build a railroad from Athens, O., up the Hocking Valley to Floodwood, and thence through Kingston and Clarksburg to Washington, in Fayette County. Several branch lines are also proposed. The line is intended to furnish another outlet for the Hocking Valley coal region.

Dayton & Ironton.—In December last this road earned \$26,096; the expenses were \$18,072, leaving the gross earnings \$8,024. Rentals, etc., amounted to \$1,307, leaving a surplus of \$6,717 for the month.

Denver & Rio Grande.—It is stated that negotiations have been in progress for some time for an adjustment of the differences existing between this company and the Denver & Rio Grande Western, and it is said, that a point has now been reached where there is a substantial agreement. The basis of agreement is said to be that the Denver & Rio Grande will be released from its guarantee on the bonds of the Western Co., and that company will receive in return for the surrender of this guarantee a quantity of rolling stock for which it is now paying rental.

The American committee of old first-mortgage bondholders, Messrs. Wm. Salomon, Sigmund Neustadt, and Carl Schurz, have issued a circular to the bondholders, in which they state: "We have recently come to an understanding with the representatives of the consolidated bonds and other junior securities, in pursuance of which we, in behalf of the bondholders represented by us, have entered into an agreement, which, if carried out, will obtain for the first-mortgage bondholders the assumption of their bonds by the reorganized company, and the recognition by the reorganized company that the first mortgage, in addition to being a first mortgage on the 295 miles specified in the deed of further assurance, is also a first mortgage on the 120 miles, more or less, hereinbefore referred to, from Alamosa to Espanola; this assumption

and recognition to be given in consideration that the first-mortgage bondholders surrender any claim that the first mortgage is a lien on any other portion or further extension of the road, or is a lien on any rolling stock of the company covered by car trust certificates and not absolutely owned by the company on June 10, 1885. * * The charge to be made to the first-mortgage bondholders for receiving the benefit of the agreements made by us for the benefit of such bondholders, with reference to the interest on interest, and with reference to extent of first mortgage and assumption of first-mortgage bonds, is 1½ per cent. of the face value of the bonds, which will be applied to the payment of expenses that have been incurred, and also as compensation to the several committees of first-mortgage bondholders."

There must be assents from 85 per cent. of the first-mortgage bondholders before May 15 next, to make the agreement binding.

East Tennessee, Virginia & Georgia.—Receiver Fink reports to the Court for the six months from July 1 to Dec. 31 last as follows:

Cash on hand July 1.....	\$177,074
Receipts from all sources.....	2,988,380
Total.....	\$3,125,454
Disbursements on all accounts.....	2,753,140

Cash on hand Dec. 31..... \$372,314

Included in the disbursements are \$105,349 payments on car trust certificates; \$136,185 for construction and betterments; \$64,155 for new steel rails, and \$80,000 for interest on Knoxville & Ohio bonds.

In Knoxville, Tenn., March 18, the United States Circuit Court granted the final decree of foreclosure and sale under the consolidated mortgage. The sale is to take place after six weeks' advertising and not later than May 25. The sale will include all the property owned, with franchises, leasehold rights, etc. The minimum price is fixed at \$10,000,000, the purchaser to pay \$100,000 cash at time of sale, with such further sums in cash as the Court may direct, the balance to be paid either in money or bonds. The road will be sold subject to lien of the bonds issued under prior mortgages, amounting to about \$7,500,000 in all.

Fairchild & Mississippi River.—This company has been organized to build a railroad from Abbottsford, Wis., on the Wisconsin Central road, westward to Fairchild, and thence southwest to a junction with the Chicago, Burlington & Northern.

Fergus Falls, Morris & Appleton.—This company has been organized to build a railroad from Fergus Falls, Minn., through Morris to Appleton, where it will connect with the Chicago, Milwaukee & St. Paul. A preliminary survey is now in progress.

Grand Rapids & Indiana.—This company is making surveys for a branch to run from Boyne Falls, Mich., west by north to Charlevoix, on Lake Michigan. The distance is about 21 miles.

Hartford & Harlem.—It is said that this company, which is organized under the general railroad law, will ask the Connecticut Legislature for a special charter, in order to avoid compliance with some of the requirements of the law, especially those forbidding grade crossings.

Hudson Tunnel Railroad.—It is reported that work is shortly to be resumed on the tunnel under the Hudson River, a small portion of which was built several years ago. The projectors of the tunnel have secured some money to go on with the work, from what quarter is not stated, although there is a rumor that it has been furnished by some of the companies whose railroads run into Jersey City. What work is to be done is to some extent uncertain, as the finished portion of the tunnel has been filled with water and it is impossible to say in what condition it may be until the water has been pumped out. Several steam pumps have already set at work to do this.

Louisville, New Albany & Chicago.—This company is offering \$1,000,000 of its new consolidated mortgage bonds. The authorized issue of these bonds is \$10,000,000, of which \$5,300,000 are reserved to retire prior liens, \$3,000,000 are exchangeable for other bonds, \$1,000,000 are to be issued to pay for new property, and \$700,000 are to remain in the treasury of the company. Of the \$8,300,000 bonds reserved \$5,300,000 are to retire prior liens on the Main Line and Indianapolis Divisions, maturing in 1910 and 1911. Arrangements have been consummated by which the remaining \$3,000,000 of reserved bonds are exchangeable for \$1,000,000 second mortgage and \$2,000,000 general mortgage bonds, which are being canceled as exchanged, leaving consolidated bonds outstanding instead. The \$2,000,000 of general mortgage bonds have already been exchanged and canceled. The terms of exchange are such that about \$2,500,000 of consolidated bonds will retire \$3,000,000 of general and second, leaving of the \$3,000,000 reserved consols about \$500,000 which will never be issued, thereby reducing the debt of the company to that extent. Upon consummation of the exchange in progress the debt ahead of the consols will amount to \$5,300,000, on 449 miles of road, or at the rate of \$11,804 per mile. The whole bonded debt will then stand as follows:

First mortgage, Main Line.....	\$3,000,000
First mortgage, Indianapolis Division.....	2,300,000
Consolidated mortgage.....	3,355,000

Total..... \$8,655,000

The road represented by this indebtedness will be 520 miles, making the bonded debt per mile \$16,645.

Manchester & Iowa.—This company has been organized to build a short line from Manchester, Ia., to a connection with the Chicago, Milwaukee & St. Paul near Delhi. The distance is about 6 miles.

Marquette, Houghton & Ontonagon.—The extension of this road to a connection with the Mineral Range Railroad at Hancock, Mich., has been completed, the bridge over Portage Lake, which forms the principal part of the connection, having been finished. The third rail being laid over the Mineral Range road, trains will be run through from Marquette to Calumet.

Milwaukee & Northern.—A considerable force is now employed on an extension of this road northward to the Menomonee iron district, and the force is being increased as fast as possible.

Missouri, Kansas & Texas.—Mr. Horace M. Barry recently brought suit against this company as owner of coupons and scrip certificates representing \$43,400 of unpaid interest on bonds issued under the income mortgage of April 1, 1876. Mr. Barry has secured from the United States Circuit Court in New York an order requiring the company to make an accounting of the earnings and expenditures since the execution of the mortgage, and also a preliminary injunction restraining the company of making any appropriation of the earnings contrary to the rights of the bondholders.

Missouri Pacific.—The great strike on this road still continues, having now completed its third week. As far as traffic is concerned, the situation continues unchanged.

Through passenger and mail and some local passenger trains are running, but freight traffic is entirely blocked, all attempts to run freight trains having been unsuccessful. Several events have marked the week, which seem to make a settlement more difficult than ever, the first being the refusal of the company to treat with Mr. Powderly, the Chief of the Knights of Labor, or with that body as an organization at all. This refusal was in such terms that all attempts at a settlement in this way were abandoned.

On March 20 the company filed in the United States Court a bill in equity against a large number of the strikers, charging them with forming a conspiracy to prevent the company from carrying on its business, and asking the Court to intervene.

On March 20 the Governors of Missouri and Kansas joined in a conference with officers of the company with the hope of arranging some basis of settlement. The company agreed to adhere to the terms of the agreement made at the time of the strike a year ago, and to take back all employees whose services were needed, but insisted that all men hired since the commencement of the strike must be kept. This offer was not accepted by the strikers, and the local assemblies of the Knights of Labor issued an address insisting that there should be no settlement until the company consents to recognize the organization.

Matters were further complicated on March 23 by a strike of the yardmen on all the roads running into Kansas City, which has for the time entirely blocked the movement of freight. Threats have been made that the strike will be extended to all the roads running out of St. Louis and Chicago, but these do not seem to come from any responsible source.

The inconvenience caused to the people on the lines of the road has been great, and much embarrassment to business has already resulted. The results must be serious should the strike continue much longer.

Mobile & Ohio.—This company's statement for February and the eight months of the fiscal year from July 1 to Feb. 28 is as follows:

	February, 1886.	1885.	Eight months, 1885-86.	1884-85.
Earnings.....	\$147,370	\$164,494	\$1,454,759	\$1,550,202
Expenses.....	117,187	129,315	981,849	1,056,696
Net earnings.....	\$30,383	\$35,179	\$472,910	\$493,506

For the eight months the gross earnings decreased \$95,443, or 6.2 per cent., and the expenses \$74,847, or 7.1 per cent., leaving a decrease of \$30,596, or 4.2 per cent., in net earnings.

Montgomery & Florida.—The bondholders who bought this Montgomery Southern road at foreclosure sale some 18 months ago have organized the Montgomery & Florida Railroad Co., and have made arrangements to extend it southward. It is now in operation from Montgomery, Ala., to Ada, 20 miles.

Nashville, Chattanooga & St. Louis.—The statement for February and the eight months of the fiscal year from July 1 to Feb. 28 is as follows:

	February, 1886.	1885.	Eight months, 1885-86.	1884-85.
Earnings.....	\$184,651	\$174,918	\$1,477,480	\$1,573,106
Expenses.....	110,341	105,033	782,359	899,994
Net earnings.....	\$74,310	\$69,885	\$595,121	\$673,112
Interest and taxes.....			450,548	456,349
Improvements.....			37,549	46,349
Total.....			\$488,027	\$502,698
Surplus.....			\$107,024	\$170,714

For the eight months the gross earnings decreased \$95,926, or 6.1 per cent.; the expenses \$17,735, or 1.9 per cent., and the net earnings \$78,291, or 11.5 per cent. There was a decrease of \$63,690, or 37.2 per cent., in the surplus over all charges.

New York, Bloomsburg & Western.—This company has filed articles of incorporation to build a railroad from Mauch Chunk, Pa., by way of Bloomsburg to New Castle, a distance of 280 miles. The incorporators are chiefly residents of Bloomsburg.

New York, Philadelphia & Norfolk.—The owner of this road, who recently secured control of the Jamesville & Washington, have, it is reported, bought the Norfolk Southern also, and are making arrangements to extend those lines from Edenton, N. C., to Jamesville and from Washington through Newbern to Wilmington, making a continuous line from Norfolk to Wilmington. They are also reported to be negotiating for the control of the Carolina Central road, or for a close alliance with the Seaboard Air Line.

Ogdensburg & Lake Champlain.—This company has arranged to charter three steamers with the privilege of purchase, and will run them on a regular line between Ogdensburg and Chicago. Arrangements are also being made for the charter of additional boats should the business of the line prove to warrant it.

Ohio & Mississippi.—This company repeats the offer to exchange its new general mortgage 5s for the outstanding Springfield Division 7s. Each bondholder making the exchange will receive \$9.33 in cash to represent the difference in interest caused by the difference in dates of the coupons on the bonds. The exchange will be made by the Union Trust Co., in New York.

Oregon Improvement Co.—The statement for January and the two months of the fiscal year from Dec. 1 to Jan. 31 is as follows:

	January, 1886.	1885.	Two months, 1885-86.	1884-85.
Earnings.....	\$109,022	\$233,124	\$404,116	\$461,316
Expenses.....	187,347	191,625	366,196	376,119
Net earn.....	\$5,675	\$41,499	\$37,920	\$85,197

For the two months the gross earnings decreased \$57,200, or 12.4 per cent., and the expenses \$9,923, or 2.6 per cent., leaving a decrease of \$47,277, or 55.6 per cent., in net earnings.

Oregon Short Line.—California papers report that a survey is in progress on a branch or extension of this road, which is owned by the Union Pacific, from Baker City, Ore., through Northern California, to Willows, and thence to a connection with the San Francisco & North Pacific road. This projected line will cross the Sierras at Deer Creek Pass, where, it is said, a practicable route can be found free from tunnels or deep cuttings.

Oregon & Washington Territory.—This company has filed articles of incorporation to build a railroad from Wallula, Wash. Ter., eastwardly to Van Syckle Cañon, and thence southeast to Pendleton, Ore. The principal office of the company is at Pendleton.

Pacific Railroads and the Government.—A Washington dispatch of March 21 says: "The Secretary of the Interior has decided that the amount paid by the Union and Central Pacific Railroad companies to the Pacific Mail Steamship Co. under certain contracts in the nature of subsidies, cannot properly, under the acts of Congress, be deducted from the gross earnings of those roads in making the net earnings out, of which the companies are required to pay a part to

the government, but that the amounts paid to the Pacific Mail Co. ought to be added to the net earnings and the lawful percentage paid to the government."

Pennsylvania.—The statement of the business of all lines east of Pittsburgh and Erie for February, 1886, as compared with the same month in 1885, shows an increase in gross earnings of \$473,775; an increase in expenses of \$36,660, and an increase in net earnings of \$437,115. The two months of 1886, as compared with the same period of 1885, show an increase in gross earnings of \$617,788; an increase in expenses of \$219,707, and an increase in net earnings of \$398,081. This gives the following statement:

	February, 1886.	1885.	Two months, 1886.	1885.
Earnings.....	\$3,551,455	\$3,077,680	\$6,970,990	\$6,332,207
Expenses.....	2,282,871	2,247,211	4,751,865	4,532,158
Net earnings.....	\$1,268,584	\$830,469	\$2,219,125	\$1,801,049

All lines west of Pittsburgh and Erie for the two months of 1886 show a deficiency in meeting all liabilities of \$231,454, being a decreased deficiency, as compared with the same period of 1885, of \$16,333.

The changes in the relief plan proposed by the company are still under discussion, and the officers who have the matter in charge have not yet concluded upon all the details. It was found necessary, therefore, to issue the following notice to the employees of the company, which was promulgated by General Manager Pugh, March 24:

"Owing to the limited time available, the modified regulations of the relief department have not been fully completed, and as some of the members of the fund may not wish to withdraw until they have had an opportunity of becoming entirely familiar with the modifications determined on, the Pennsylvania Railroad Co. and the other companies associated in the organization of the relief department will contribute to that department the full amount of the contributions for the month of April for those members of the relief fund who have not withdrawn prior to March 25. Under the provisions of this notice no contributions for April will therefore be deducted from the March rolls."

Philadelphia & Reading.—At a meeting of the Reorganization Trustees in Philadelphia, March 22, the plan of reconstruction was completed and a parchment copy of it will be sent to the trustees for their signatures. Messrs. Dickson and Welsh, representing the syndicate, were added to the Board of Trustees, and Messrs. Dickson, Welsh, Dupont, Cochran and West were appointed as the Executive Committee of the Board. It shall be the duty of this committee to carry out the details of the plan and to name a day within which the deposit of securities under the plan shall be made and the assessments paid. This date will probably be June 30.

President Gowen on March 23 issued his plan for the reorganization of the company's affairs. He proposes to issue \$100,000,000 in 4 per cent. 70-year consolidated mortgage bonds, out of which are to be reserved sufficient for car trusts, real estate liens, coal land mortgages and all issues which cannot presently be paid off prior to the general mortgage, and the remainder is to be devoted to retiring the present existing Reading general mortgage and the floating debt of the company. Secondary to this he proposes to issue "Cumulative 4 per cent. first-preference income bonds," secured by mortgage, subordinate to the above-described new consolidated mortgage. This security is to be used to retire the income mortgage, the convertible adjustment scrip, the first series 5s, a proportion of the second series 5s, some of the leased canal securities, and also to provide for a liberal bonus to be given with such of the new consolidated mortgage bonds as will be issued to retire the general mortgage and the floating debt. The amount of this issue may be increased, only, however, to take in leased line securities. Subsequent to this, it is proposed to issue "Second preference cumulative 4 per cent. income bonds," subordinate to the above, which are to be used to retire the remaining portion of the second series 5s, the convertible and debenture bonds and scrip, and some of the canal and leased line securities, the convertibles retaining their right of conversion into shares. The present preferred and common stock are to remain as now, the preferred stock to receive past earned dividends in common shares at par. The deferred income bonds are also to remain as at present. The New Jersey Central is to be retained in friendly alliance, either under modified lease at rentals equal to earnings or under special traffic contract. It is announced that non-acceptance of this plan by those interested is to involve exclusion, and reorganization will in such case be effected by "speedy and amicable foreclosure." In presenting this plan various reasons are given why the Reading bondholders and shareholders should not accept the Reading Reorganization Trustees' plan, and it is further announced that the plan above outlined will be issued "as soon as the London agent of the company, who is now in America, can reach England." A statement of fixed charges is also formulated, which shows figures in favor of the above plan as compared with the Trustees' plan.

The Receivers have presented a petition to the Court asking authority to build or purchase 23 locomotives, 55 passenger cars, 100 stock cars and 500 box cars. They represent that these additions to the equipment are needed for the proper conduct of the business of the road. The Court referred the petition to the Special Master, who is to consider and report.

Poughkeepsie, Hartford & Boston.—It is reported that arrangements have been made for the purchase of this road, when the foreclosure of the mortgage is completed, by Boston parties, who purpose extending it eastward to a connection with some line to Boston. This is probably a revival of the old plan by which this road was to have been made the western end of the Massachusetts Central line.

St. Joseph & Grand Island.—It is again reported that negotiations are in progress for the transfer of the control of this road from the Union Pacific to the Chicago, Rock Island & Pacific Co. It is reported that the last-named company has offered to guarantee 5 per cent. on the bonds.

Savannah, Dublin & Western.—Officers of this company state that contracts will be let shortly for their entire line from Savannah, Ga., to Macon, and that the survey will be pushed from Macon to Birmingham with the intention of starting work on the entire road as soon as possible. The company's present expectation is to build a line from Savannah to Macon this year and an extension to Birmingham next year.

South Fork.—This company has been organized to build a railroad from a connection with the Northern Pacific into Cour d'Alene mining region, and surveys are now being made for the line. The incorporators include Mr. S. S. Gliddon, of St. Paul, Minn., and P. Armstrong and J. J. Brown, of Montana.

Texas & Pacific.—Freight traffic continues on this road under the protection of the United States marshals, although several attempts have been made to interrupt trains and disable engines. A small force has been collected in the shops, but none of the striking shopmen have returned to the work. A partial agreement has been reached to submit the

case of Hall, whose discharge was the origin of the strike, to the United States Court, which will pass on the action of the Receivers.

Union Pacific.—A committee representing the men employed in the shops of this company recently had a conference with General Manager Callaway, at Omaha, and it is reported that their object was to secure the limitation of the hours of labor in the shops to 8 hours a day. Mr. Callaway, on being interviewed, was unwilling to make any statement.

Utica & Black River.—At a special meeting held in Utica, N. Y., March 18, the stockholders ratified the agreements for the consolidation of the Clayton & Theresa and the Ogdensburg & Morristown companies with this company. The consolidated company assumes all liabilities; no stock will be issued on the Ogdensburg & Morristown, all of its stock having been owned by the Utica & Black River Co. On the Clayton & Theresa \$102,000 stock of the consolidated company will be issued in exchange for the \$204,000 old stock now outstanding. Both roads have been leased and operated by this company ever since their completion, so that the consolidation makes only a formal change.

West Shore.—The trains of this road commenced to run through to Rochester, N. Y., on the New York Central track on March 21, the connection at Fairport having been completed. The main line of the West Shore road, it will be remembered, passes some miles south of Rochester, and its trains have run into that city on the Buffalo, New York & Philadelphia tracks.

Winfield & Fort Smith.—This company has submitted to the towns along its line in Southern Kansas a proposition to vote aid to its projected road, which is to extend from Winfield, through Southern Kansas and the Indian Territory to Fort Smith, Ark. The company offers to begin work in June provided the aid requested is voted.

Wisconsin Central.—On the Chicago Extension the track is now reported laid from Schleiserville, Wis., to the crossing of the Chicago Belt line, a distance of 120 miles. The completion of the line into Chicago depends upon the result of the negotiations now in progress for the land needed.

Wyoming Eastern.—Surveys have been completed for this projected line from the crossing of the Oregon Short Line, 18 miles from Granger, Wyo., eastward to Independence Rock, and the survey is to be extended from that place to Ft. Fetterman.

ANNUAL REPORTS.

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Troy & Greenfield.

This road, which includes the Hoosac Tunnel and is owned by the State of Massachusetts, extends from Greenfield, Mass., through North Adams, to the Vermont line, 44 miles. The report of the Manager is for the year ending Sept. 30.

Under the present arrangement the road is held open to all connecting lines, companies using it being charged 50 per cent. of the gross receipts as toll. The state provides for the maintenance of way, but each road furnishes its own motive power and pays all expenses other than maintenance. The income for the year was as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Tolls.....	\$276,692	\$281,414	D. \$4,722	1.7
Other sources.....	36,560	34,091	L. 2,469	4.6
Total.....	\$313,252	\$315,505	D. \$2,253	0.7
Expenses.....	261,757	219,026	L. \$42,731	19.6
Net earnings.....	\$51,525	\$97,340	D. \$45,824	47.2

The expenses were made up as follows last year: Operating, \$239,581; performing services for other roads for which payment was collected, \$22,176; total, \$261,757.

The tolls received were from the following companies:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Fitchburg.....	\$207,661	\$211,138	D. \$3,477	1.6
Troy & Boston.....	17,465	18,992	D. 1,527	8.0
Boston, H. T. & W.....	28,687	28,372	L. 315	1.1
N. H. & Northampton.....	22,679	22,912	D. 233	1.0
Total.....	\$276,692	\$281,414	D. \$4,722	1.7

The total earnings on traffic passing through the tunnel were last year \$503,384, or \$12,577 per mile. Of these earnings \$132,573 were from passengers, \$405,873 from freight and \$14,938 from mails, etc.

The train mileage for last year was as follows:

	Revenue train.	Construction.	Switching.	Total.
Fitchburg.....	326,627			326,627
Troy & Boston.....	36,736			36,736
Boston, H. T. & W.....	72,923			72,923
N. H. & Northampton.....	71,932			71,932
Troy & Greenfield.....		24,000	118,080	142,080
Total.....	508,218	24,000	118,080	650,298

The total number of trains passing through the tunnel last year was 11,330, an average of 36 trains daily, not including Sundays.

The traffic carried on these trains was as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passengers carried.....	37,238	31,710	L. 15,578	5.0
Passenger-miles.....	6,058,720	5,698,479	L. 360,241	7.0
Tons freight carried.....	1,418,060	1,421,910	D. 3,850	0.3
Ton-miles.....	55,322,007	52,999,731	L. 2,322,276	4.5

The average rate per passenger-mile was 2.19 cents; per ton-mile, 0.73 cent. The number of freight cars moved

through the tunnel was: Loaded, 117,670; empty, 49,190; total, 166,860. Of these, 83,381 were east-bound and 83,479 west-bound. Of the east-bound cars 97.4 per cent. and of the west-bound 43.7 per cent. were loaded.

In addition to the traffic above, the construction trains hauled 11,603 tons of material 363.213 miles.

Expenditures for new construction during the year were \$35,710 for second. The second track is now completed over the whole line, its total cost having been \$991,133.

There were used in renewals 200 tons steel rails and 18,678 new ties, and 3,500 ft. new sidings were built. A system of interlocking signals and switches was put in at Conway Junction, where the New Haven & Northampton joins this road.

Pennsylvania & New York.

This company owns a line from Wilkes-Barre, Pa., to Waverly, N. Y., 105.19 miles, with 24.02 miles of branches. It leases the State Line & Sullivan road, Monroeton, Pa., to Bernice, 24 miles, with an extension to Loyalsock, 3.79 miles, making 157 miles in all. There are 195.34 miles of second track, spurs and sidings. The company is controlled by the Lehigh Valley Co., which owns practically all of the stock. The report is for the year ending Nov. 30.

Additions last year were the Loyalsock road, 3.79 miles, and 5.81 miles of sidings. The company has the right to run trains over the Erie from Waverly to Buffalo, and it controls the Buffalo Creek road, which gives it terminal and yard facilities in Buffalo. From that city a line was last year built eastward 6.59 miles to secure additional room and better connections.

The equipment consists of 87 locomotives; 2 passenger and 2 combination cars; 38 caboose cars; 5 wreck and tool, 63 service and 88 gravel cars. The passenger and freight cars used are furnished by the Lehigh Valley Co.

No balance sheet is given in the report. The company has \$1,061,700 common stock; \$4,000,000 preferred stock and \$3,000,000 bonds.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Coal	\$1,065,931	\$1,258,844	D. \$192,713	15.3
Freight	404,322	603,031	D. 198,709	18.0
Passengers	202,916	224,789	D. 21,873	9.7
Mail and express	21,165	18,314	I. 2,851	15.8
Miscellaneous	43,126	46,560	D. 3,434	7.3
Total	\$1,827,460	\$2,151,348	D. \$323,878	15.1
Expenses	1,504,420	1,541,704	D. 30,274	2.5
Net earnings	\$325,040	\$609,544	D. \$284,504	46.6
Gross earn. per mile	11,790	15,150	D. 3,360	22.3
Net	2,097	4,283	D. 2,186	51.1
Per cent. of exps.	82.2	71.7	I. 10.5	

The decrease in earnings was apparently due chiefly to a heavy decrease in freight rates. The net earnings were sufficient to provide for all taxes, interest and rentals and to leave a small surplus.

The traffic for the year was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passengers carried	338,378	3,875,212	I. 19,626	0.2
Passenger-miles	8,922,214	9,735,517	D. 813,303	8.4
Tons freight	888,843	814,150	I. 44,693	5.3
Ton-miles	96,538,080	69,804,284	I. 26,733,796	38.3
Tons anthracite	1,440,762	1,351,449	I. 89,313	6.6
Tons bituminous	231,062	302,100	D. 71,038	23.5
Total tons coal	1,671,764	1,653,509	I. 18,255	1.1
Ton-miles an hr.	122,204,284	115,722,748	I. 6,481,536	5.6
Ton-miles bit.	5,195,444	8,328,976	D. 3,133,532	37.6

Total coal ton-miles 127,399,728 123,051,724 I. 3,348,004 2.7

The greater part of the anthracite coal was carried northward. Shipments from Waverly over the Erie were 545,330 tons, of which 370,719 tons were hauled by the company's own motive power. Shipments over the Geneva, Ithaca & Sayre were 426,597 and over the Southern Central 283,243 tons.

The total tonnage of general freight and coal was 2,560,607 tons, an increase of 62,949 tons, or 2.5 per cent. The total ton-mileage was 223,938,408, an increase of 30,082,400 ton-miles, or 15.4 per cent.

The average rates received on passenger and general freight were, in cents:

	1885.	1884.	Decrease.	P. c.
Per passenger-mile	2.36 cts.	2.46 cts.	0.10 ct.	4.1
Per freight ton-mile	0.51	0.60	0.09	17.6
Per coal ton-mile	0.84	1.02	0.18	21.4

The large decrease in the rates on general freight and coal was due to the competition for west-bound coal business and the very low rates prevailing on through freight for most of the year.

Expenditures for construction last year were \$501,692. The chief work now in hand is the Vosburg Tunnel, which will shorten the main line and will do away with the use of a section of road full of sharp curves and difficult to maintain. This tunnel will probably be finished next summer.

Chicago, Milwaukee & St. Paul.

At the close of its last fiscal year, Dec. 31, 1885, this company owned and operated 4,921 miles of road, an increase during the year of 117 miles, as shown below. The average mileage for the year was 4,862 miles, against 4,780 miles for 1884.

The equipment includes 684 locomotives; 295 passenger, 48 sleeping, 8 parlor, 9 dining and 215 baggage, mail and express cars; 12,572 box, 2,326 stock, 353 refrigerator and 4,044 flat and coal cars; 452 caboose and service cars. This is an average of 0.14 locomotive, 0.12 passenger train car, 3.92 freight cars and 0.09 service car per mile of road.

The general account is as follows, as of Dec. 31:

Liabilities:		
Capital stock, preferred	\$21,540,900	
common	30,904,361	
	\$52,445,161	
Bonds outstanding		101,470,000
Unpaid vouchers and pay-rolls	1,729,268	
Dividends and interest unclaimed	164,958	
	1,894,226	
Income account	7,049,109	
Total liabilities		\$162,858,496
Assets:		
Cost of road and equipment		154,228,775
Coal lands	\$617,028	
Bonds, stock, etc., of other companies	754,792	
Balances due from agents, conductors, etc.	386,638	
United States government	227,615	
Miscellaneous accounts, current balances	329,077	
Stock of material on hand	1,543,217	
Bills receivable	488,948	
Cash on hand		4,367,343
		4,262,378
Total assets		\$162,858,496

Capital stock was increased during the year by the issue of \$4,999,917 preferred stock. There was added to the funded debt \$50,000 real estate bonds issued and \$450,000 Fargo & Southern bonds assumed. There were redeemed \$67,000 Duquesne Division bonds, \$17,000 Wisconsin Valley bonds

and \$200,000 land-grant bonds; a total of \$284,000, leaving a net increase in the bonded debt of \$1,216,000.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight	\$17,101,742	\$16,128,964	I. \$972,778	6.0
Passengers	5,490,737	5,768,843	D. 278,106	4.6
Mail, express, etc.	1,811,794	1,575,191	I. 236,603	15.0
Total	\$24,413,273	\$23,470,998	I. \$942,275	4.0
Expenses	14,512,471	13,859,628	I. 652,843	4.7
Net earnings	\$9,900,802	\$9,611,370	I. \$289,432	3.0
Gross earn. per mile	5.021	4.910	I. 111	2.3
Net	2.036	2.011	I. 25	1.3
Per cent. of exps.	59.9	59.1	I. 0.8	

Extraordinary expenses during the year were: Real estate, \$100,161; new bridges, buildings, sidings, etc., \$490,723; new equipment, \$411,863; total, \$1,002,750. The new equipment includes 20 locomotives, 20 passenger cars, 100 box and 50 refrigerator cars.

The income account is as follows:

Net earnings, as above	\$9,900,802
Other income	105,939
Total	\$10,006,741
Interest	\$6,086,574
Dividend (3% on preferred and 2% on common)	1,351,541
	7,448,115
Balance, surplus for the year	\$2,558,626
Surplus, Jan. 1, 1885	\$5,532,981
Dividends, April (3% on pref. and 1% on common)	1,042,498
	4,490,483
Total surplus, Dec. 31, 1885	\$7,049,109

From this surplus the dividend of April, 1886 (3% on preferred and 2% on common stock), will have to be deducted.

The traffic for the year was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Train-miles				
Passenger	6,106,153	5,827,235	I. 278,918	4.7
Freight and switch	13,637,054	13,394,275	I. 242,779	1.8
Service	860,170	1,158,481	D. 298,311	25.8
Total	20,603,377	20,379,991	I. 223,386	1.1
Passengers carried	4,819,187	4,904,678	D. 85,491	1.7
Passenger-miles	214,550,187	225,851,443	D. 11,301,256	5.0
Tons freight	6,482,560	6,021,016	I. 461,544	7.6
Ton-miles	1,337,721,433	1,247,737,233	I. 89,984,200	7.2

Average rate: Per passenger-mile 2.56 cts. 2.55 cts. I. 0.01 ct. 0.4 Per ton-mile 1.28 " 1.29 " D. 0.01 " 0.8

The earnings per freight train-mile were \$1.25; per passenger train-mile, \$0.90. The expenses per train-mile, all trains, were \$0.74. Locomotive service cost 22.9 cents per mile run and maintenance of way 12.6 cents.

The freight tonnage last year was made up as follows:

	Tons.	Per ct.
Grain, flour, hay, etc.	2,137,350	32.97
Dairy products	37,718	0.58
Live stock, pork and beef	462,637	7.14
Salt	58,319	0.90
Coal	695,478	10.73
Stone, brick, lime, etc.	354,916	5.47
Lumber	969,425	14.96
Iron in all forms	132,275	2.04
Agricultural implements	64,773	1.00
Miscellaneous	574,727	8.27
Total	1,033,800	15.94
Total	6,482,560	100.00

The largest item of grain was wheat, which furnished 817,849 tons, or 12.62 per cent. of the total. Of the total ton-miles east-bound freight furnished 53.3 per cent. and west-bound 46.7 per cent. The average rate per ton-mile was 1.28 cents east-bound and 1.27 west-bound.

The average rate per ton-mile for 21 years has been as follows, in cents:

	1865.	1866.	1867.	1868.	1869.	1870.	1871.
1865	4.11	3.78	3.40	3.10	2.82	2.54	2.28
1866	3.78	3.40	3.10	2.82	2.54	2.28	2.01
1867	3.40	3.10	2.82	2.54	2.28	2.01	1.74
1868	3.10	2.82	2.54	2.28	2.01	1.74	1.48
1869	2.82	2.54	2.28	2.01	1.74	1.48	1.29
1870	2.54	2.28	2.01	1.74	1.48	1.29	1.03
1871	2.28	2.01	1.74	1.48	1.29	1.03	0.87

The directors' report says: "The entire cost of the company's property, including rolling stock, depot grounds, cattle yards, elevators, machine shops, warehouses, docks and other property, together with five bridges across the Mississippi River, is represented by stock and bonds as follows, viz.:

Preferred stock	\$21,540,900
Common stock	30,904,361
Total stock	\$52,445,161

Mortgage and land-grant bonds, including all liens on purchased roads 101,470,000

Total capitalization, stock and bonds \$153,915,161 "For 4,921 miles, being at the rate of \$31,277 per mile.

"The company has acquired by purchase the Fargo & Southern Railway, 117 miles in length, extending from Ortonville, on the Hastings & Dakota Division, to Fargo. It has assumed the bonded indebtedness thereof, amounting to \$1,450,000. By this purchase it has acquired an important position in the Red River Valley, which is believed to be essential to its protection. No other new lines have been acquired or built.

"The policy of maintaining the excellent condition of the property has been continued, and a liberal expenditure in betterments has been made. Notwithstanding the depression in commercial affairs during the past year, the earnings of the company have increased \$942,275. With a return of commercial prosperity a further increase in earnings is confidently expected.

"The company has acquired right of way and depot grounds in a favorable location for a new passenger station at Milwaukee, which will greatly facilitate the handling of its large passenger traffic at that point. It has also begun the purchase of grounds for additional freight houses at Chicago, in order to meet the needs of its growing freight traffic at that point."

Lehigh Valley.

This company owns a line from Perth Amboy, N. J., to Wilkes-Barre, Pa., with numerous branches and spurs in the Lehigh anthracite coal region. The statement of track, with the increase over last year, is as follows:

	Miles.	Inc. or Dec.
Main track, main line and branches	317.01	I. 2.44
Second track	184.21	D. 1.71
Second track laid, but used as sidings	8.24	I. 4.23
Sidings	293.64	I. 5.88
Total track, Nov. 30	803.10	I. 5.88

The report is for the year ending Nov. 30. The company also controls the Pennsylvania & New York, the Geneva, Ithaca & Sayre, the Buffalo Creek and the Southern Central roads, but the operations of those lines are not included in the report. It owns, through the Lehigh Valley Coal Co., whose report is given below, a large anthracite coal property, and also a considerable bituminous coal property in the Snow

Shoe District. The company also leases the Morris Canal, from Easton to Jersey City.

The equipment includes 325 locomotives; 116 passenger and 58 baggage, mail and express cars; 3,008 box, 10 fruit, 57 stock, 47 line, 50 bark, 1,842 gondola, 522 flat, 34,862 coal, 93 caboose and 162 tunnel cars; 1 pay car, 48 wreck and tool, 22 supply, 5 water, 338 gravel and 9 gravel train caboose cars. The increase during the year was 3 locomotives; 1 passenger and 4 baggage cars; 50 box, 34 stock, 1 tunnel and 4 caboose cars; 2 wreck and tool, 3 supply and 9 gravel cars.

Of the total mileage of track 592.54 miles are now laid with steel rails, 18.95 miles having been laid with steel last year.

The stock and bonds of the company are as follows:

Preferred stock	\$166,300
Common stock	32,992,800
Total stock	\$33,059,100
First mortgage 6s.	\$5,000,000
Second mortgage 7s.	6,000,000
Consolidated 6s., total \$14,647,000:	
Sterling bonds	3,507,000
Coupon bonds	1,825,000
Registered bonds	8,304,000
Annuity bonds	1,011,000
Floating debt, less cash on hand, none	25,647,000

Total stock and debt \$8,746,100

Stock is \$104,413, bonds \$80,905; total, \$185,318 per mile of road. In reality the cost of road per mile is much less, as the stock and bonds represent, besides the road owned in fee, a very large investment in controlled roads and coal properties.

There were \$189,000 sterling bonds drawn for redemption and payable Dec. 1 last, reducing the funded debt by that amount, or to \$25,458,000. The Morris Canal Co. boat loan of \$220,000 matured Oct. 31 last and has been bought by the Lehigh Valley Co., with the exception of a small amount not presented for payment.

The earnings for the year were as follows:

	Earnings.	Expenses.	Net earnings.	P. c. of exps.
Coal trains	\$6,079,542	\$1,031,278	\$5,048,264	40.9
Freight trains	1,617,236	1,181,104	436,132	73.0
Passenger trains	860,139	676,616	183,523	78.7
Total	\$8,556,917	\$4,888,998	\$3,667,919	57.1
Total 1884	8,948,207	5,246,073	3,702,134	48.6

Decrease \$391,290 \$357,075 \$34,215 1.5 P. c. of decrease 4.4 6.8 0.9

The earnings last year were \$26,993 gross and \$11,571 net per mile, against \$28,317 and \$11,716 in 1884.

The income account for the year was as follows:

Net earnings of railroad as above	\$3,667,919
Other income, interest on investments, etc.	732,345
Total net income	\$4,400,264
Interest on bonds and guarantees	\$2,059,542
Interest, taxes, loss on Morris Canal, depreciation, etc.	650,385
Dividends on stock, 5 per cent.	1,690,334
	4,370,161

Balance to profit and loss \$30,103

The total coal tonnage of the road for the year was: anthracite, 6,258,178; bituminous, 54,252; total, 6,312,430 tons, an increase of 243,463 tons, or 4 per cent., over 1884. The total tonnage for five years has been: 1885, as above, 6,312,430; 1884, 6,068,967; 1883, 5,592,646; 1882, 6,336,141; 1881, 5,870,701 tons. The tonnage of 1885 exceeded that of any previous year, except 1882 and 1883.

The traffic for the year was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passengers carried	2,273,710	2,359,067	I. 14,643	0.7
Passenger-miles	33,648,225	35,394,518	D. 1,746,293	4.7
Tons freight	2,364,778	2,606,828	D. 242,050	9.3
Ton-miles	155,641,176	164,694,503	D. 9,053,327	5.5
Tons anthracite coal	6,258,178	6,008,990	I. 249,179	4.1
Coal ton-miles	497,968,512	473,022,633	I. 24,945,879	5.3

A new iron bridge was built to replace one carried away by flood. One of the coal wharves at Perth Amboy has been renewed and the approaches filled in with earth.

The report says: "We have added to our equipment during the year new coal and freight cars, costing in the aggregate \$361,000. These are in addition to replacements and repairs which have been properly maintained.

"The active prosecution by the Pennsylvania & New York Canal